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Recent Literature on Solar Astrophysics, p. 192

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 9 FEBRUARY 1958 No. 2

SPECIAL FEATURE IN THIS ISSUE

Compilation of Recent Literature on Solar Astrophysics

By
Mary L. Rice

(For complete table of contents see back cover)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises an annotated bibliography of important references on a special subject (usually arranged chronologically). No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
5. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
9. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

1. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
5. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
9. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	

Vol. III, 1952

1. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
5. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
9. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

1. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
5. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
9. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

1. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
5. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
9. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges	
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics	
7. Radar Cloud Physics	8–9. Atmos. Nuclei	10. Weather Modification	11. Cooling Power

Vol. VII, 1956

1. Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
4. Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
7. Snow Micromet.	8. Snow Micromet. (Suppl.)	9–11. Tropical Cyclones

Vol. VIII, 1957

1. Solar Weather Relations	2. Night Airglow	3. Forecasting Special Elements
4. Forest Micrometeorology	5. Hydromet. Forecasting	6. Numerical Forecasting (Suppl.)
7. Albedo	8. Meteors	9–10. Tropospheric Propagation
		11. Medical Meteorology

Vol. IX, 1958

1. Radioastronomy
2. Solar Astrophysics

Other bibliographies in preparation are:

Actinometers	*Long Range Forecasting*	*Singularities*
Geomagnetism	*Ozone*	*Synoptic Aerology*
High Atmosphere Temperatures	*Radioactivity*	*Waves and Currents*

Part III contains a listing of reviews, translations, reprints, and the contents of important publications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue comprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

See also: **Guide to arid zone research** (UNESCO), 9.2–36.

9.2–1 551.5(08)

*Belgium. Institut Royal Météorologique, **Éléments de météorologie.** [Elements of meteorology.] (Successive chapters appeared in *Ciel et Terre* or as *Contribution*, No. 22 from the *Belgium. Institut Royal Météorologique*, **1955–**. Last issue seen, No. 22:309–369, **1956.** (Ch. 10), figs., refs., eqs.) Contents: Ch. 1, Defrise, P.: **Considérations générales** [General considerations]. *Ciel et Terre*, 71(3/4):89–110, March/April **1955.** Ch. 2, Defrise, P.; Grandjean, J. and Poncelet, L.: **Instruments et observations** [Instruments and observations]. *Ibid.*, 71(4/5):151–175, May/June **1955.** Ch. 3, Malet, L.: **Mesures en altitude** [Upper air measurements]. *Ibid.*, 71(7/8):223–253, July/Aug. **1955.** Ch. 4, Descamps, A. and Dufour, L.: **Éléments de thermodynamique et de statique de l'atmosphère** [Elementary thermodynamics and statics of the atmosphere]. *Ibid.*, 71(9/10):315–346, Sept./Oct. **1955.** Ch. 5, Defrise, P.: **Notions de mécanique de l'atmosphère** [Concepts of mechanics of the atmosphere]. *Ibid.*, 71(11/12):365–306, Nov./Dec. **1955.** Ch. 6, Dufour, L.: **L'eau dans l'atmosphère** [Water in the atmosphere]. *Ibid.*, 72(1/2):41–72, Jan./Feb. **1956.** Ch. 7, Nicolet, M.: **Le rayonnement du soleil** [Solar radiation]. *Ibid.*, 72(3/4):121–150, March/April **1956.** Ch. 8, Defrise, P.: **Les mouvements atmosphériques** [Atmospheric movements]. *Ibid.*, 72(5/6):281–309; May/June **1956.** Ch. 9, Defrise, P.: **Météorologie synoptique et prévisions météorologiques** [Synoptic meteorology and meteorological forecasting]. *Ibid.*, 72 (7/8):365–404, July/Aug. **1956.** Ch. 10, Poncelet, L.: **Climatologie** [Climatology]. *Ibid.*, 72(9/10):569–598, Sept./Oct. **1956.** Ch. 10, Pt. 2, *Ibid.*, 72(11/12):635–664, Nov./Dec. **1956.** Ch. 7, Pt. 2, Nicolet, M.: **Les rayonnements solaire, atmosphérique et terrestre** [Solar, atmospheric and terrestrial radiation]. *Ibid.*, 73(3/4):113–145, March/April **1957. DLC**—Ch. I of this excellent series of articles takes up scope and growth of meteorology (cited from *MAB*, Vol. 2 (3 & 4), 1951), approaches to problems, forecasting, history of observations and networks, synoptic charts, WMO, IUGG, IGY, etc. Ch. II discusses barometers, thermometers, hygrometers, psychrometers, anemometers, precipitation gages, measurement of hydro-, photo- and electrometeors and clouds. Ch. III takes up aneroids, hypsometers, hygrometers, radiosondes, wind measurements (pibals and radio theodolites), radar winds and their accuracy, radiometeorology, radar precipitation detection, absorption and refraction of electromagnetic waves. Ch. IV takes up thermodynamics and statics, stability equations, graphical methods for soundings, etc. Ch. V deals with kinematics, especially as applied to synoptic charts; Ch. VI with nuclei, fog, clouds, ice, saturation and condensation, etc.; Ch. VII with radiation laws, solar constant, absorption, counter-radiation, actinometry and radiation data; (even more detailed in Pt. 2); Ch. VIII with general and local circulations from a mean and a synoptic point of view; Ch. IX with observations, transmissions, analysis and forecasts (synoptic), and Ch. X with definitions, elements, scales, microclimate, climatic influences, networks, observation and their treatment, classification, climagrams, air mass climatology, applications, WMO, paleoclimates, etc. The series is more-or-less in textbook style, but has a great variety and thoroughness from a theoretical or practical, dynamic or synoptic point of view. A wealth of illustrative data and charts (e.g., radiation charts), with special attention to data obtained in Belgium, is incorporated in the various sections. *Subject Heading:* **1. Popular meteorology.** —*M.R.*

9.2–2 551.586:63

Conference on Weather-Agriculture Research in the Great Plains, Amarillo, Texas, Oct. 18–19, 1956, **Proceedings of a Conference by the Research Committee, Great Plains**

Agricultural Council and the Joint USDA-Weather Bureau Committee on Weather and Agriculture in the Great Plains. Wash., D. C., Feb. **1957.** 79 p. refs. Contents: Johnson, Sherman, E., **The need for weather-agriculture research in the Great Plains,** p. 1–4 Schloemer, R. W.: **Progress in recording and tabulating historical weather data,** p. 5–7. Army, T. J., **Research in weather-cereal crop production relations in Montana,** p. 8–9. Moldenhauer, William C., **Research in weather-crop yield relations in Big Spring, Texas,** p. 10–11. Zingg, Austin W., **Application of the extreme value statistical distribution to precipitation and crop yields,** p. 12. Coffman, Frank A., **Crop breeding for particular weather hazards,** p. 13–14. Hehn, E. R., **The relationship of climatology to plant breeding,** p. 15–17. Barger, Gerald L., **Research in weather and agriculture in the North Central Region (NC-26),** p. 18–20. Bostwick, Don, **Adapting dryland farming to variations in weather and crop yields in Montana,** p. 21–22. Hildreth, R. J. and Burnett, Earl, **Weather and decision making in the Plains areas of Texas,** p. 23–30. Caprio, Joseph M., **Agricultural climatology in Montana,** p. 31–34. Bohmont, Dale W., **Weather-agriculture research in Wyoming,** p. 35–36. Myers, Max, **Weather-agriculture research in South Dakota,** p. 37–38. Andrews, Fred C., **Weather-agriculture research in Nebraska,** p. 39. Carter, John, **Some weather-agriculture research in New Mexico,** p. 40. Laude, H. H., **Influence of rainfall and soil moisture on yields of wheat in Kansas,** p. 41–44. Hardy, William E., **The IBM punched card climatological project at Oklahoma A & M College,** p. 45–47. Thomas, Gerald W., **Some aspects of weather-agriculture research on range lands,** p. 48–51. Beall, James M., **Report on Weather Bureau's research affecting weather-agriculture relationships in the Great Plains,** p. 52–53. Upchurch, M. L., **Plans for new research in the economics of adapting agriculture to weather variations,** p. 54–56. Kelley, Omer J., **Plans for new research in weather-agriculture relations in the Great Plains,** p. 57–58. Van Bavel, C. H. M., **Related work of the eastern section,** p. 59. Coffman, F. C., **Plans for field crops research in the Great Plains,** p. 60–62. Bark, L. D., **Plans for weather-agriculture research at the Kansas State Agricultural Experiment Station,** p. 63–64. Thorne, M. D., **Plans for weather-agriculture research at the Oklahoma Agricultural Experiment Station,** p. 65. Myers, Max, **Plans for weather-agriculture research at the South Dakota Experiment Station,** p. 66. Thomas, Gerald W., **Plans for expanded and new research on weather-agriculture relations in Texas,** p. 67. Beall, James M., **Needs for new research in meteorology and climatology, (discussion),** p. 68–70. Bohmont, Dale W., **Needs for new research in weather-soil-plant relationships (discussion),** p. 71–72. Hildreth, R. J., **Needs for new research in the economics of production (discussion),** p. 73–74. Kelso, M. M., **Making positive plans for the next step towards attaining an expanded and integrated program of research in weather-agriculture research in the Great Plains,** p. 75–76. **DWB** (M:63 C748p)—Research and research aids for studying the relation between climate or weather and crops in the Great Plains from Montana to Texas are reported in this series of brief papers presented at the conference. Studies of specific crops as well as of specific areas, planned projects, and capabilities of the weather services in providing data are reviewed. *Subject Headings:* **1. Agrometeorology conferences 2. Great Plains, United States. I. Great Plains Agricultural Council II. Joint USDA-Weather Bureau Committee on Weather and Agriculture in the Great Plains.**—*M.R.*

9.2–3 551.510.41:551.469:546.264

Conference on Nuclear Processes in Geologic Settings, Williams Bay, Wisc., Sept. 21–23, 1953, **Proceedings of the Conference . . . co-sponsored by the University of Chicago, National Research Council (and) National Science Foundation.** Pub. **1953.** figs., tables, refs. at end of most ch. **DWB** (551.082 C748p), **DLC** (QE513.N3, 1953)—Among the 23 papers read at this conference, which are summarized here, are several of interest to meteorologists. These are: 11) The composition and origin of meteorites by H. Craig, p. 41–44; 15) Natural radiocarbon and the rate of exchange of carbon dioxide between the atmosphere and the sea, by H. E. Suess, p. 52–56; 28) The measurement of paleotemperatures by H. C. Urey, p. 71–72 and 23) Noble gases in the earth's atmosphere by L. B. Borst, p. 79–82. Also 22) Application of natural isotopic tracer and dilution techniques to geological problems by Harmon Craig, p. 76–78. A discussion accompanies each summary. *Subject Headings:* **1. Radiocarbon dating 2. Carbon dioxide exchange atmosphere-sea 3. Paleotemperature measurement. I. National Research Council. Committee on Nuclear Science.**—*M.R.*

9.2–4 551.585.53(08)(72)

Instituto Mexicano de Recursos Renovables, Mexico, D. F., **Mesas redondas sobre problemas de las zonas áridas de México, Biblioteca Central de la Ciudad Universitaria, 24–28, enero, 1955.** [Round table on problems of arid zones in Mexico, held at the Central Library of the Ciudad Universitaria, Jan. 24–28, 1955.] Mexico, D. F., **1955.** 262 p. diagr. (fold.), tables, map (fold.). Contents: Contreras Arias, Alfonso: **Definicion de las zonas áridas y su delimitación en la República Mexicana** [Definition of the arid zones and their limits in Mexico], p. 1–40. García Quintero, Andrés: **Hidrología de las zonas áridas de México** [Hydrology of the arid zones of Mexico], p. 41–83. Miranda, Faustino: **Formas de vida vegetales y el problema de la delimitación de las zonas áridas de México** [Forms of vegetable life and the problem of the limits of the arid zones of Mexico], p. 83–123. Gonzalez Cosío, Manuel: **Observaciones y trabajos en las zonas áridas de México** [Observations and projects in the arid zones of Mexico], p. 125–175. Hernández Corzo, Rodolfo: **Problemas sobre la industrialización de los productos de las zonas áridas de México** [Problems of industralization of the products of the arid zones of Mexico], p. 177–234. Beltran, Enrique: **México y sus zonas áridas: problemas y perspectivas** [Mexico and its arid zones: problems and prospects], p. 235–262. **DWB**—The first round table under the guidance of Contreras Arias contains a discussion of the distribution of arid and semi-arid zones over the world and in Mexico in particular of the meteorological factors which cause aridity and semi-aridity especially those characteristics of the atmospheric circulations over Mexico and adjoining regions and quantitative methods of expressing the humidity or aridity of a region. THORNTHWAITE's climate classification is described and it is applied to a classification of the moisture regime of Mexico. Maps showing the distribution of potential evapotranspiration and moisture conditions in Mexico and a graph showing the observed and calculated evapotranspiration by the formulas of THORNTHWAITE, TABER, MCCLOUD-DUNOVAN and BLANEY and CRIDDLE are included. The discussion on the hydrology of the arid zones of Mexico by GARCÍA QUINTERO includes a discussion of the location of the arid zones in Mexico, their topography, the rainfall characteristics, coefficients of surface drainage and irrigation. Each principal topic is accompanied by an extensive discussion. *Subject Headings:* **1. Arid zone research 2. Symposia on arid zone research 3. Mexico.**—*I.L.D.*

9.2–5 551.510.42(08)

National Air Pollution Symposium, Pasadena, Calif., April 1955, **Proceedings.** Los Angeles, **1955.** 229 p. figs., tables, bibliogs. Price: $5.75. (For listing of contents, *see* Pt. III of this issue. Papers will be abstracted separately.) **DWB** (M10.42 N277p)—The conference comprised 6 sessions on general aspects, analytical techniques and instrumentation (2 sessions), physiological effects on animals and on plants, and legal aspects. Three luncheons and one dinner gave opportunity for a lecture on **Primitive planetary atmospheres** by Harold C. Urey, on the **Epidemiological approach** by the Surgeon General U.S.P.H.S., etc. Over a score of the papers presented in this volume are of interest to meteorologists. *Subject Headings:* **1. Atmospheric pollution. I. California Institute of Technology II. Air Pollution Control Association III. Air Pollution Foundation, Los Angeles IV. California. Univ. V. Los Angeles. Univ. of Southern California VI. Stanford Research Institute.**—*M.R.*

9.2–6 551.501.8:551.576.7:061.3

Weather Radar Conference, 6th, Cambridge, Mass., March 26–28, 1957. **Proceedings.** Issued **1957.** 372 p. Also: **Proceedings Supplement.** Issued **1957.** 62 p. figs., tables, refs., eqs. Both mimeo. Both loose-leaf. (For listing of contents, *see* p. 1435–1437, Oct. 1957, *MAB*. Various papers are abstracted separately.) **DWB** (M01.81 R124pc)—The proceedings of the 6th Weather Radar Conference comprise 55 papers arranged under the headings: 1) particle structure and size distribution, 2) precipitation physics, 3) severe storms, 4) synoptic interpretations and radar climatology, 5) scattering and attenuation, 6) anomalous echoes, 7) surveys of operations and research. The supplement contains 4 papers which were received late, and discussion summaries of the 7 sections named above. *Subject Headings:* **1. Radar weather conference 6th, 1957 2. Cloud physics research. I. American Meteorological Society II. Blue Hill Meteorological Observatory III. U. S. Air Force Cambridge Research Center IV. Massachusetts Institute of Technology.**—*M.R.*

9.2–7 550.4(08)

†**Physics and chemistry of the earth, Vol. 1.** Ed. by L. H. Ahrens; Kalervo Rankama and S. K. Runcorn. N. Y., McGraw-Hill, **1956.** 317 p. tables, figs., numerous bibliogs., eqs. **DLC** (QE501.P53) Review by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A.*, 9(4):531–532, 1957. **DLC**—Major articles, each with an extensive bibliography on the subject. Contents: Jones, Sir Harold Spencer: **The origin of the solar system,** p. 1–16. Verhoogen, J.: **Temperatures within the earth,** p. 17–43. Ahrens, L. H.: **Radioactive methods for determining geological age,** p. 44–67. Bullen, K. E.: **Seismology and the broad structure of the earth's interior,** p. 68–93. Roy, Rustum and Tuttle, O. F.: **Investigations under hydrothermal conditions,** p. 138–180. Correns, Carl W.: **The geochemistry of the halogens,** p. 181–234. Tomkeieff, S. I.: **Geochemistry in the U.S.S.R.,** 1948–1953, p. 235–284. Complete author and subject indexes are appended. *Subject Headings:* **1. Geochemistry. I. Ahrens, L. H.** (*ed.*).—*M.R.*

9.2–8 551.58

†Budyko, M. I., ed., **A. I. Voeĭkov i sovremennye problemy klimatologii.** [A. I. Voeĭkov and contemporary problems in climatology.] Leningrad, Gidrometizdat, **1956.** 282 p. figs., bibliogs. throughout. **DWB**—In commemoration of the 40th anniversary of the death of A. I. Voeĭkov, the Central Geophysical Observatory held, during 1–4 Feb. 1956, a series of scientific meetings devoted to Voeĭkov's role in the development of modern climatology and the nature and problems of contemporary climatology. Papers were delivered by members of the institute as well as by invited guests who were the most distinguished climatologists of the U.S.S.R. (Listing of contents of this volume are found in Pt. III, p. 846, June 1957, *MAB*. The papers are abstracted separately.) *Subject Headings:* **1. Climatology 2. Voeĭkov's contribution to climatology.**—*I.L.D.*

TEXTBOOKS

See also: **Aeronautical met. texts** (Rossi), 9.2–112.

9.2–9 551.582.1:551.589(47)

§Alisov, Boris Pavlovich, **Klimat SSSR.** [Climate of the U.S.S.R.], Moscow, Izd-vo Moskovskogo Universiteta, **1956.** 125 p. 62 figs., 9 maps (fold.) laid in, 10 refs. **DLC** (QC989.R49A39)—This textbook might well be called the "Synoptic climatology of the U.S.S.R.," for its chief emphasis is on the development of various peculiar synoptic types of weather which affect the various sectors of European and Asiatic U.S.S.R. Ch. I discusses the radiational and circulation factors of the climate, and climatic regions of the U.S.S.R. Ch. II goes into detail on the dynamic and synoptic climatology of the Soviet Arctic; III, on European U.S.S.R. (7 sub-regions discussed separately); IV, the Urals, West Siberian Plains, Altai and Saian; V, Eastern Siberia; VI, the Far East; VII, Caucasus and VIII, Middle Asia. The book is full of mean and actual synoptic charts plus many supplementary climatic charts. This is the best regional climatology thus far published for the U.S.S.R. *Subject Headings:* **1. Climatology of U.S.S.R. 2. Synoptic climatology of U.S.S.R. 3. Textbooks 4. Soviet Arctic 5. U.S.S.R.**—*M.R.*

9.2–10 551.511.33:551.521

†Gröber, Heinrich and Erk, Sigmund, **Die Grundgesetze der Wärmeübertragung.** [Basic laws of heat transfer.] 3d ed. rev. by Ulrich Grigull. Berlin, Springer-Verlag, **1955.** 428 p. 190 figs., 50 tables, numerous refs. and eqs., bibliog. p. 420–421. Price: DM 37.50. **DLC** (QC320.G86 1955). Review by P. Courvoisier in *Archiv. f. Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 9(3):430, **1956. DWB**—Many aspects of heat transfer or exchange in various media, conduction, convection, condensation, evaporation, turbulent exchange, radiative heat exchange, etc. are treated systematically in this textbook—mainly from a theoretical standpoint but based on wide experience. Harmonic analysis, differential equations, boundary problems, temporal and spatial aspects, effect over spheres, bundles, etc., free convection, austausch in gases, vapors, liquids and solids and other problems of thermodynamics are discussed in detail with numerous examples. *Subject Headings:* **1. Heat transfer 2. Radiative transfer 3. Textbooks. I. Grigull, U.**—*M.R.*

9.2–11 551.508(02)

Holzbock, Werner G. (*Development Engineer, Askania Regulator Co., Chicago, Ill.*), **Instruments for measurement and control.** N. Y., Reinhold Publishing Corp., **1955.** 371 p. numerous figs. (incl. photos.), tables, eqs. **DWB** (530.78)—A wide variety of temperature, humidity, moisture, pressure, flow, density, viscosity and speed instruments used in industrial processes are described, illustrated and their operation and accuracy, sensitivity, range, etc. discussed. Most of the equipment is of the self-recording remote-control type, though some is for direct control of conditions or processes. Electrical circuits, charts, cuts of the instruments, photographs of equipment and panels, and schematic drawings are included. A long glossary of terms is appended. *Subject Headings:* **1. Instrument textbooks 2. Industrial instruments.**—*M.R.*

9.2–12 551.589(02)

†Pedelaborde, Pierre, **Introduction à l'étude scientifique du climat: notions élémentaires de climatologie dynamique.** [Introduction to the scientific study of climate: elementary concepts of dynamic climatology.] Paris, Centre de Documentation Universitaire, **1954.** 150 p. figs., tables, foot-refs. bibliog., p. 128 (7 refs.). **DLC** (QC 981.P4)—A course in dynamic climatology as a methodology, wherein the problem of sources of data, definition of weather and climate, analytical vs. synthetic climatology, atmospheric structure, and dynamics, radiation, temp. circulation (general and local), thermodynamics and thermodynamic diagrams, disturbances, upper air charts, and Parisian weather types explained by means of dynamic climatology. An extensive bibliography and many schematic diagrams are included. *Subject Heading:* **1. Dynamic climatology textbooks.**—*M.R.*

9.2–13 91(02)

Von Engeln, O. D. and Netschert, Bruce Carlton, **General geography for colleges.** Clare M. O'Gorman, cartographer. N. Y., Harper & Bros., **1957.** 681 p. figs. (incl. photos), tables throughout. **DWB** (910 V945g), **DLC**—In this modern and finely illustrated geographical text, weather and climate are discussed in Ch. 6 (p. 88–102), and the specific climates of the various major climatic zones in subsequent chapters. (Rain forests, Ch. 7 & 8; Tropical rainy and Savanna climates, Ch. 9, 10 & 11; Warm dry climates, Ch. 12 & 13; Mediterranean climates, Ch. 14–16; Humid subtropical climates, 17 & 18; Marine west-coast climates, 19–21; Mid latitude dry climates 22–23; Humid continental, 24–26; Subarctic, 27–28; Polar, 29–30). In each there is a lot of discussion of the relation of climate and weather to the geographical factors and selected data. *Subject Headings:* **1. Regional geography 2. Climates of geographical zones 3. Geography textbooks.**—*M.R.*

9.2–14 551.46:551.48

Zubov, Nikolaĭ Nikolaevich, **Osnovy ucheniia o prolivakh mirovogo okeana.** [Basic study of straits in the oceans.] Moscow, Gosudarstvennoe Izd-vo Geograficheskoĭ Literatury, **1956.** 239 p. 93 figs., tables, 46 refs. **DLC** (GC51.Z8)—A monograph or textbook giving the basic facts about tides, currents, ice and other hydrographic information on the various straits and gulfs in the Arctic, Pacific, Atlantic, Mediterranean, Black and other seas; and along the margins of the continents. Diagrams or charts show the currents in many of the most important straits and schematic diagrams show the relations of depths, water masses, salinity, density, ice, etc. Wind effects are discussed on p. 59–63. History of hydrographic surveys of the ocean straits, and of hydrography in general is found in the introduction. *Subject Headings:* **1. Hydrography of straits 2. Wind effects on water in straits.**—*M.R.*

POPULAR METEOROLOGY

See also: **Elements of meteorology,** 9.2–1; **Russian expeditions, Arctic** (Zubov), 9.2–55; **Graham Land expedition** (Walton), 9.2–61.

9.2–15 551.5(023)

§Sawyer, J. S., **The ways of the weather.** London, A. & C. Black, **1957.** 97 p. 38 figs., 15 plates. Price: 12 sh 6 d. **DLC** (QC863.S34). Review by R. S. Read in *Weather*, London,

12(6):198, June **1957.** Review by J. B. R. in *R.M.S., Q.J.*, 83(357):412, July **1957. DWB**—A popular book on meteorology with many fine illustrations written by a top synoptician and research meteorologist, and covering many of the latest advances (such as numerical weather prediction, radar storm detection, artificial rain, long waves, jet stream, the high atmosphere, etc.). Numerous synoptic examples are given to illustrate various aspects of the weather, fronts, cyclones, cold-waves, and forecasting techniques using upper air as well as surface charts. Recent theories of cloud physics and dynamic or synoptic meteorology are also included. Local and world-wide weather, short and long range forecasts, observations and analyses are discussed. *Subject Heading:* **1. Popular meteorology.**—*M.R.*

9.2–16 550.3(023) 551.506.2(02)

Fraser, Ronald, **Once round the sun: the story of the International Geophysical Year 1957–58.** London, **1957.** 160 p. 32 figs. **GB-MO**—The first part of this book is a popular account of geophysics—Ch. 1, The spinning earth; 2, Climate and weather; 3, Currents, waves and tides; 4, Patterns in the outer atmosphere (including ionosphere); 5, Sunspots and solar flares. Pt. II, Towards new horizons, deals with the International Geophysical Year—Ch. 6, A year of planned observation; 7, Antarctica; 8, Division of labour-meteorology, oceanography, glaciology, ionospheric physics, the aurora, geomagnetism, cosmic rays, seismology and gravity, latitudes and longitudes; 9, Rockets and satellites, including American, but not Russian satellites; 10, The summing up, a short chapter on practical results expected from the IGY. *Subject Headings:* **1. Geophysics 2. IGY program 3. Popular science books.**—*C.E.P.B.*

9.2–17 551.578.487

†Flaig, Walther, **Lawinen: Abenteuer und Erfahrung, Erlebnis und Lehre.** [Avalanches: adventure, experience and lesson.] 2nd ed. Wiesbaden, F. A. Brockhaus, **1955.** 251 p. 82 plates. 128 refs. Price: DM 16.50. **DLC** (DQ823.F6 †955). Review by Arnold Lunn in *Journal of Glaciology*, London, 3(21):82, March **1957. DLC**—The many types of avalanches experienced in the Alps are described and beautifully illustrated in this popular edition. However, many technical matters are incorporated along with the more sensational information about major disasters of early history (1689) and of recent years (1954). Progress in forecasting or in protection against avalanches from HANNIBAL to the present time is reviewed at some length; modern research on snow, snow cover and their physical properties is described at even greater length; classification of avalanches outlined and each type described and illustrated; and a final section devoted to protective and rescue measures. An excellent subject index and an extensive bibliography are appended. *Subject Headings:* **1. Avalanches 2. Avalanche classification 3. Alps.**—*M.R.*

9.2–18 551.5:078.55

Friskey, Margaret, **The true book of air around us.** Pictures by Katherine Evans. Chicago, Childrens Press, **1953.** 47 p. **DLC** (QC863.F846)—An illustrated juvenile "science" book with brief chapters on wind, hurricanes, weather maps, clouds, lightning, thunder, rain, fog, hail, sleet, snow and facts about the air. The text is very simple (short sentences and words all monosyllables and one-sentence paragraphs). Illustrations (in color) are imaginative and fairly accurate as far as schematic representation of weather processes (in simple concepts) can go and remain simple (i.e., in terms of a child's understanding and interest). *Subject Headings:* **1. Juvenile meteorology books 2. Popular books.**—*M.R.*

9.2–19 550.3:91.04(99)

Migot, André, **Thin edge of the world.** Boston, Little, Brown and Co., **1956.** 242 p. figs., photos. (Published in England as **The Lonely South.**) **DLC** (G875.M5A3)—A popular account of the history of Kerguelen and its natural conditions and of the author's voyage to Kerguelen in 1952, his year's stay at the base there (Port-aux-Français) and a side trip to Princess Elizabeth Land in Antarctica and to Heard Island to Mawson early in 1954, and return to Melbourne March 31, 1954. Aside from the description of weather conditions in Kerguelen and the Australian sector of the Antarctic, the problems of establishing scientific bases and geophysical stations in these regions and personal relations among the various

factions at such a base which normally occur in isolated places constitute a valuable contribution to Arctic or Antarctic planning. *Subject Headings:* **1. Geophysical expeditions 2. Kerguelen Island 3. Mawson, Antarctica.**—*M.R.*

9.2–20 551.5:91.04(98)

Mikkelsen, Ejnar, **Mirage in the Arctic.** Trans. from the Danish by Maurice Michael. London, Rupert Hart-Davis, **1955.** 216 p. photos. **DLC** (G720.M68)—An account of the author's experiences in 1906–7 while attempting vainly to find land in the Beaufort Sea north of Alaska and the Yukon Territory. Weather enters into all of his descriptions of the life on ship, in the ice, on sledge trips over the ice and in villages or towns. His ship was crushed and he was shipwrecked on the way out from Valdez which he had reached by dog team from Fairbanks, Nome and Barrow. The last chapter gives details of the discovery 40 years later of Fletcher's Ice Island and pictures of it and the meteorological station. *Subject Headings:* **1. Arctic expeditions 2. Fletcher's Ice Island 3. Beaufort Sea.**—*M.R.*

9.2–21 551.556.3

Karmishin, A. V., **Veter i ego ispol'zovanie.** [Wind and its utilization.] Moscow, Gos. Izd-vo Tekhniko Teoret. Lit-ry, **1951.** 62 p. 34 figs., 7 refs. **DLC** (QC863.K28)—A popular work on wind, wind power and wind generators, dealing specifically with causes of atmos. circulation and local winds, effects of windbreaks, topography, insolation, snow, etc.; observation of wind on land and sea; sand and other storms and, finally, the engineering and practical aspects of windmills and machines. *Subject Heading:* **1. Wind utilization.**—*M.R.*

9.2–22 551.57(023)

Zamorskiĭ, Aleksandr Dmitrievich, **Atmosfernye iavleniia.** [Atmospheric phenomena.] Leningrad, Gidrometeoizdat, **1954.** 90 p. 37 figs. (Nauchno Populiarnaia Biblioteka.) **DLC** (QC863.Z25)—A popular scientific treatise on the various water, ice, precipitation, fog, dust, optical and electrical phenomena observed by meteorologists in the atmosphere. Squalls, dust devils, tornadoes, various types of snow, hail, icing of objects in the air and on the ground, frost, thunderstorms, auroras, various types of fog, etc. are discussed and illustrated schematically. (*See* 7.11–12, Nov. 1956, *MAB* for a much fuller treatment by the same author of a number of the phenomena—especially those hydrometeors composed of ice.) *Subject Headings:* **1. Atmospheric ice 2. Hydrometeors.**—*M.R.*

MONOGRAPHS

See also: **Oceanographic data, Pacific,** 9.2–81; **Cloud effects on sky brightness** (Barr et al.), 9.2–116; **Air-borne instruments** (Newton), 9.2–119; **Climatic fluctuations and cereal yield, Finland** (Hustich), 9.2–125; **Hurricane track-sea temp. relationships** (Fisher), 9.2–197; **Infrared spectroscopy** (Adel), 9.2–207; **Thunderstorm electricity,** 9.2–270.

9.2–23 551.583(02)

*Arakawa, Hidetoshi, **Kiko Hendō Ron.** [Climatic changes.] Tokyo, Chijin Chokan, May **1955.** 82 p. 16 figs., 26 tables, refs. throughout.—A wealth of climatic, hydrologic, tree-ring and phenological data is systematically compiled and analyzed to provide evidence of climatic changes or fluctuations in Japan and to some extent in other parts of the earth. The first chapter deals with the warming up of recent decades; Ch. 2 with evidence from cherry blossom dates from 812 to 1864 compared with 1917 to 1953; Ch. 3 with freezing dates of Lake Suwa (1443–1953); Ch. 4 with Arctic ice and ocean temps; Ch. 5 with O. Petterssen's and Ch. 6 with Drayson and his follower's work on polar wandering; Ch. 7 deals with the Swedish and M.I.T. work on circulation changes with respect to climatic changes; and 8 with Vize's (Wiese) investigations. In Pt. 2, climatic changes in the Tohoku District of N. Japan (standard deviation of monthly mean temperature (1893–1942), mean summer and winter temp. in Tohoku District (1883–1954), correlation between summer and winter temp.; secular variation of yield of rice in Tohoku, the record cold year in Japan 1884 following Krakatoa, bad rice harvest in Japan, the effect of nuclear explosions on incoming radiation, correlation of summer temps. in Japan with those in central England. A catalog of sunspot numbers from 1749–

1950 and the relationships to weather according to W. KOPPEN, C. E. P. BROOKS, C. EASTON, etc., three historic famines in Japan and their causes (1750–1950), tree ring data for Japan (1119–1920), lake level changes in Lake Suwa (1883–1950), level of Yangtze River (1865–1937), date of S.W. monsoon onset in India (1891–1943) and rainfall in Seoul, Korea (1770–1907). *Subject Headings:* **1. Climatic changes in Japan 2. Textbook on climatic changes 3. Japanese language 4. Japan.**—*M.R.*

9.2–24 551.582.1 :551.586.63 (473) :63

*†Gol'tsberg, Ida Arturovna and Drozdov, O. A. (*eds.*), **Klimaticheskie resursy tsentral'nykh oblasteĭ evropeĭskoĭ chasti SSSR i ispol'zovanie ikh v sel'skokhoziaĭstvennom proizvodstve.** [Climatic resources of the central oblasts of the European part of the U.S.S.R. and their utilization in agricultural production.] Leningrad, Gidrometeoizdat, **1956.** 310 p. 137 figs., 106+ 18 tables, bibliog. p. 255–258. At head of t-p: GUGMS pri Sovete Ministrov SSSR, Glavnaia Geofizich. Observatoriia. **DWB** (M8 G629K)—This agrometeorological monograph, the collective work of various members of the A. I. Voeĭkov Central Geophysical Observatory, contains concise description of the climates of European Russia and special emphasis on its influence upon agricultural production. The six chapters are as follows: (1) Basic physical geographical, climatic and agricultural characteristics of the central oblasts of European Russia; (2) A description of the climate by seasons; (3) General characteristics of the growing season. This chapter includes an analysis of the thermal resources—namely length of periods with temperatures above 5, 10 and 15° and length of frost-free period, temperature, soil temperature, etc.; moisture supply; curves of drought characteristics and of hail; (4) Dates of onset of the developmental phases of the principal agricultural crops (summer and winter wheat, potatoes, maize, cabbage, etc.); (5) Melioration of the inner climate—including the alteration of the hydrometeorological regime of farmland by shelter belts—change in wind velocity, turbulent exchange, in air temperature and moisture, in frost-free period, etc.; and (6) Climatic regions of the territory with particular reference to the requirements of agricultural production. A supplement contains extensive statistical climatic data giving mean values of the various individual meteorological variables in this region. Throughout the text there are interspersed numerous tables, graphs and charts. *Subject Headings:* **1. Agriculture climatology 2. Climate of European U.S.S.R. 3. European U.S.S.R.**—*I.L.D.*

9.2–25 551.582.2 :551.586.63 (485) :63

*Uppsala. Jordbrukstekniska Institutet, **Sommarvädret i Sverige.** [Summer weather in Sweden.] Its *Meddelande*, No. 264, **1955.** 105 p. numerous tables and charts. **DWB**—An attractive pamphlet comprising an elaborate analysis of weather statistics for Sweden for May, June, July and Aug., with scores of original graphs, contingency tables, and a number of charts or maps. The analysis is in terms of operational factors such as weather favorable for hay drying or other farm activity and is based on rainfall data for 1901–50, and precip. and temp. data for 1901–30 for a score of stations. Fog, humidity, temp. and wind speed, as well as precip. and temp. data are analyzed and the results included. *Subject Headings:* **1. Climate of Sweden 2. Summer climate of Sweden 3. Agricultural climatology 4. Sweden.** —*M.R.*

9.2–26 551.576.1 :629.135.2 (02)

*Appleman, Herbert S., **Derivation of jet-aircraft contrail-formation curves.** *U. S. Air Weather Service, Technical Reports*, 105–145, Jan. **1957.** 46 p. 10 figs., 7 tables, 3 refs. **DWB** (MO55 U58a)—An up-to-date manual giving, respectively, theoretically and empirically derived curves for determining the probability of contrail formation behind jet aircraft, under varying conditions of pressure, temp. (of wake and of environment) and humidity or of combinations of these. Effect of proximity or relation to tropopause, of season, geographical location (in U. S.) and the relation between theoretical and empirical curves are discussed and illustrated. Data are given in tables as well as curves. No significant difference could be found regionally or seasonally, but greater probability exists above tropopause than below. *Subject Headings:* **1. Condensation trail probability curves 2. Condensation trail forecasting.** —*M.R.*

9.2–27 551.510.53:551.557:551.524.7:551.511.12

†Murgatroyd, R. J., **Winds and temperatures between 20 km and 100 km—a review.** *Royal Meteorological Society, Quarterly Journal*, 83(358):417–458, Oct. **1957.** 9 figs., 7 tables, bibliog. p. 454–458, 19 eqs. **DWB**—This useful summary attempts to synthesize all information on winds and temperature up to 100 km or more. Theoretical considerations are dealt with first—temperature distribution and its control by the radiation field in summer and winter, and other physical factors affecting winds, including friction, dynamics of the ionosphere, magneto-hydrodynamic forces and atmospheric tides. Then follows a summary of experimental methods and available measurements. Radiosondes and radar extend to 25–30 km, exceptionally 42 km. Near 30 km there is a change from westerly winds in winter to easterly in summer. N-S sections of observed temperatures and zonal winds, pole to pole, are shown. Drifts of sodium vapor have been measured to 110 km. Anomalous propagation of sounds of explosions gives winds up to 60 km. Rockets, rocket grenades and density measurements by searchlight scattering are next described. Visual, photographic and radio observations of meteors extend to above 100 km and results are summarized. Noctilucent clouds at 80 km generally agree with visual observations of meteors. A long section deals with radio propagation studies of fading records, which can be interpreted as winds up to 150 km. Finally determinations of composition, temperature and motion of the upper atmosphere from airglow and aurora are discussed. Results of temperature and zonal wind determinations are then collected together and vertical meridional sections drawn for summer and winter. Temperatures, heights of pressure contours and densities are proposed for a standard atmosphere, winter and summer. Finally, some remarks are made on coupling of stratosphere with troposphere and convection. *Subject Headings:* **1. Upper air temperatures 2. Upper air winds.**—*C.E.P.B.*

9.2–28 551.573:551.501:551.511

†Bernard, Étienne A., **Le déterminisme de l'évaporation dans la nature: étude des aspects géophysique et écologique du problème dans le cadre du bilan énergétique, Première partie, Généralités théoriques.** [Laws of evaporation in nature: study of the geophysical and ecological aspects of the problem from the point of view of energy balance, Pt. 1, General theory.] *Institut National pour l'Étude Agronomique du Congo Belge, Brussels, Série Scientifique*, No. 68, **1956.** 162 p. numerous eqs. bibliog. p. 159–162.—A major monographic treatment of all of the factors entering into the calculation of evaporation, with emphasis on the theoretical aspects. The basic formulas, molecular diffusion in a boundary layer, turbulent transport of vapor, latent heat, equations for the energy balance, global radiation, heat exchange, friction, Bowen's ratio, Penman's formula and, lastly, the equations for the energy balance of an isolated body (the other 5 chapters deal with infinite horizontal surfaces). An excellent bibliography is appended. *Subject Headings:* **1. Evaporation calculation theory 2. Energy balance method of evaporation calculation.**—*M.R.*

9.2–29 551.508.21

Bossy, L. and Pastiels, R., **Étude des propriétés fondamentales des actinomètres.** [Study of the fundamental properties of actinometers.] *Belgium. Institut Royal Météorologique de Belgique, Mémoires*, Vol. 29, **1948.** 116 p. 28 figs., foot-refs., 12 tables, numerous eqs. **DLC** (QC912.B6)—A sizeable monograph giving the theory and experimental results of tests of various actinometers under uniform and non-uniform conditions. The sensitivity of the receiver and the calibration of the actinometers are also treated at length. The Ångström and the Linke-Feussner actinometers are especially subjected to examination. *Subject Headings:* **1. Actinometers 2. Ångström pyrheliometer 3. Linke-Feussner actinometer.** —*M.R.*

9.2–30 551.521.1:551.501.721:697

De Coster, M.; Schuepp, W. and Van der Elst, N., **Le rayonnement sur des plans verticaux à Léopoldville, Congo Belge.** [Radiation on vertical planes at Leopoldville, Belgian Congo.] *Belgium. Académie Royal des Sciences Coloniales, Classe des Sciences Techniques, Mémoires in* 8°, *n.s.*, 2(1), **1955.** 50 p. 14 graphs, 16 tables, 11 refs., 6 eqs. Reprinted as *Belgian*

Congo. Service Météorologique Publication, No. 7, 1955. **DWB**—On the basis of solar radiation measurements (made at the Binza Radiation Observatory (Leopoldville) the solar heat load upon fully exposed surfaces has been determined. Tables and graphs are presented giving the monthly mean instantaneous values of global and of sky radiation for good and average weather upon a horizontal surface, monthly mean instantaneous values of direct solar radiation for very good and average weather upon a horizontal surface, mean monthly instantaneous values of total radiation impinging upon a vertical surface for eight different orientations for good and average weather in mcal/cm² min. and total mean daily radiation for each month and orientation in kcal/cm² day. The accompanying text contains a discussion of the methods of calculation, analysis of the characteristics of the radiation load upon the differently oriented surfaces and a comparison of the radiation data for this station with that calculated by the ASHVE procedure. *Subject Headings:* **1. Radiation on vertical surfaces 2. Radiation calculations 3. Leopoldville, Belgian Congo.**—*I.L.D.*

9.2–31 551.594

†Mühleisen, R., **Atmosphärische Elektrizität.** [Atmospheric electricity.) *Handbuch der Physik*, Berlin, 48:541–607, **1957.** 44 figs., 13 tables, numerous foot-refs., 37 eqs., bibliog. p. 605–607 (63 refs.). **DWB** (551.03 N236)—History of research on atmospheric electricity and lightning, elements and constants used, ionization by ultraviolet and cosmic radiation and by radioactivity, total ionization, atmospheric ions, measurement methods, mobility of ions, conductivity and other effects, waterfall effect, effect on ice particles, dissipation of charges, condensation nuclei and large ions, precipitation effect, ionization balance, ionosphere, currents, fields, fair weather, cloud, fog, thunderstorm, precipitation and other fields, space charge, height variations, current effects and measurement, convection currents, atmospheric electricity balance over the earth, and other aspects of atmospheric electricity are treated systematically and quantitatively in this review article. *Subject Heading:* **1. Atmospheric electricity.**—*M.R.*

9.2–32 551.582.1:551.585.7(432.2)

†*Ehwald, Ernst, **Vergleichende Forstklimatologie des Thüringer Gebirges und benachbarter Mittelgebirge.** [Comparative forest climatology of the Thuringian mountains and neighboring plateaus.] *Deutsche Akademie der Landwirtschaftswissenschaften zu Berlin, Wissenschaftliche Abhandlungen* No. 11, **1956.** 184 p. 47 figs., 12 maps (in color), 48 tables, bibliog. 150 refs. p. 180–184. **DLC** (QC989.G3T53)—A nicely edited and printed technical monograph covering general weather conditions, stau and föhn conditions in the German Mittelgebirge, and under varying synoptic weather situations in the Thüringen Gebirge, precipitation regime, temperature regime, sunshine and cloud, fog and frost, humidity, wind, etc. The work is full of colored charts of the regional distribution of the various elements, graphs, scatter diagrams, climatic diagrams, etc., and contains a bibliography of 150 references to literature on local climate of the German Mittelgebirge from 1863 to 1953, incl. The most important factor, aside from the upslope and föhn action due to the orography, is the forested nature of the area (beautifully illustrated by 11 panoramic photographs). Comparative climatological and phenological data are presented in anaytical tables for the region and for other analogous regions of Central Europe. *Subject Headings:* **1. Climate of Thuringia 2. Forest climates 3. Mountain climates 4. Climatic data for central Germany 5. Thuringia.** —*M.R.*

9.2–33 551.506.8(43)

*Seyfert, F., **Phänologische Tabellen 1947–1950 aus dem Gebiet der Deutschen Demokratischen Republik.** [Phenological tables, 1947–1950, for the German Democratic Republic.] *Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Abhandlungen*, 5(37), **1957.** 366 p. almost entirely tables. map (fold.) in pocket. **DLC**—Extensive phenological data for about 800 stations in East Germany for 1947, 1948, 1949 and 1950 are tabulated by stations within each region. A regional, alphabetical and index number (ref. folded location map) list of stations is appended. *Subject Headings:* **1. Phenological data for East Germany 2. East Germany.**—*M.R.*

9.2–34 551.582.1(776)

*Schantz-Hansen, T. and Jensen, Raymond A., **40 years of weather at the Cloquet Experimental Forest.** *Minnesota. Agricultural Experiment Station, St. Anthony Park (Univ. of Minnesota), Station Bulletin*, No. 436, Nov. **1956.** 19 p. 3 figs., 14 tables. **DWB**—Temp., precip., frost, degree-day, cloudiness and wind direction for 1912–1951 are discussed and the month-by-month data tabulated for Cloquet Experimental Forest 4 mi S.W. of Cloquet, Minn. (46°31′N, 92°30′E, 1265 ft. elev.). Precip. during growing season as well as calendar year is tabulated and the trends and variations over the 40 years shown graphically. *Subject Headings:* **1. Climate of Cloquet Forest, Minn. 2. Cloquet Forest, Minn.**—*M.R.*

9.2–35 551.509.67:551.578.4(494)

*Switzerland. Eidgenössische Kommission zum Studium der Hagelbildung und Hagelabwehr, **Grossversuch II zur Bekämpfung des Hagels auf der Magadinoebene, 4. Versuchsjahr.** [Project 2 for hail control in the Magadino Plain, 4th year of experimentation.] Its *Tätigkeitsbericht*, No. 9, 1956, pub. **1957.** 68 p. 13 figs., 52 tables. **DWB** (M78.7 S979g, 1956)—In 1956, like in previous years (for reports on 1953–1955 seasons *see* 6J–338, Oct. 1955 and 8.7–24, July 1957, *MAB*), a network of ground-based AgI generators was operated in the Magadino Plain on days with a chance of hail. The 1956 report covers the same details as the previous ones: 1) distribution of the generators; 2) weather development and thunderstorm occurrence during the report period (May 14–Oct. 13, 1956); 3) detailed statistical and synoptic analysis of thunderstorms and hailstorms and 4) hail damage according to insurance records. As a whole the four years of hail control experiments (and more particularly the last three years of uniform operation with automatic generators) are found to "have produced no reliable and conclusive evidence of an inhibitory effect of silver iodide seeding on hail formation." Possibilities of a statistical evaluation were examined by P. SCHMID who concluded that the available data cannot furnish significant results by any statistical method (the regression method fails because of the poor correlation between target and control areas in the case of hail). In his paper (to be published), P. SCHMID recommends that seeding operations be reorganized according to a chance-distribution scheme, which will be done starting with the next season. *Subject Headings:* **1. Hail prevention in Switzerland 2. Cloud seeding with silver iodide 3. Magadino Plain, Switzerland. I. Sänger, R. II. Staub, H. III. Thams, J. C. IV. Schmid, P.**—*G.T.*

9.2–36 551.45:06

UNESCO, **Guide book to research data for arid zone development.** Ed. by B. T. Dickson. Its *Arid Zone Research*, Vol. 9, **1957.** 191 p. figs., tables, bibliogs. Contents: Dickson, B. T.: **Introduction,** p. 11–20. George, F.: **Mapping,** p. 21–25. Bilham, E. G.: **Climatology,** p. 26–43. Hills, E. Sherbon: **Geology and geophysics,** p. 44–50. Christian, C. S., Jennings, J. N. and Twidale, C. R.: **Geomorphology,** p. 51–65. Tison, J.: **Hydrology,** p. 66–106. Green, Herbert: **Soil resources,** p. 107–120. McGinnies, W. G.: **Vegetation,** p. 121–133. Leloup, M.: **Forests,** p. 134–140. Sergent, E.: **Population,** p. 143–151. Jacob, E. H.: **Land tensure,** p. 152–155. Whyte, R. O.: **Animal husbandry,** p. 156–168. **DWB, DLC**—"At its fifth session the Advisory Committee for Arid Zone Research recommended that UNESCO publish a volume which would present the broad requirements of each part of a study needed to make an integrated survey of any area on the semi-arid to arid zone." The present volume is a result of this recommendation. Each chapter is devoted to "the basic requirements of each survey and it presents the material with a minimum of technical detail." *Subject Heading:* **1. Arid zone research. I. Dickson, B. T.** (*ed.*).—*I.L.D.*

HANDBOOKS AND ATLASES

See also: **Condensation trails** (Appleman), 9.2–26; **Bay of Biscay Pilot** (Gt. Brit. Hydrographic Off.), 9.2–82.

9.2–37 551.510.5:551.501.7

*U. S. National Advisory Committee for Aeronautics, **Standard atmosphere—tables and data for altitudes to 65,800 feet.** Its *Report*, 1235, pub. **1955.** 114 p. mostly tables. **DWB,**

DLC—Detailed tables give values of temp., pressure, density, specific weight, viscosity, kinematic viscosity, sound speed, etc. in metric and in English units for heights of 5000 m to 20,000 m (55 mb) and from 16,500 ft to 65,800 ft, as computed by the NACA for the ICAO. Basic assumption techniques used in computative formulas and equations used or derived etc. are explained in text. Data are given in graphic as well as tabular form. A summary of basic constants or data is provided in C.s.g. metric and English units. Tables give data to every 50 mb (to 11 km) or every 100 m (11–20 km); for every 1 mm (to 100 mm) and to every 0.1 mm (100–55 mm) and to corresponding precision for English units (100 ft to 36,200 ft). *Subject Headings:* **1. ICAO standard atmosphere tables 2. Upper air normals.**—*M.R.*

9.2–38 551.586:628.8:912

Air Conditioning, Heating and Ventilating, **Air conditioning engineers' atlas; climatic data for the solution of design and operating problems in winter heating and summer cooling throughout the United States. . .** ed. by Clifford Strock and C. H. B. Hotchkiss. New York, Industrial Press, **1939.** 72 p. maps, tables. **DLC** (QC983.A63)—This volume contains climatic data arranged in tables and depicted on zoned colored maps giving data for a hundred cities distributed over the U. S. on the date heating season begins and ends in a normal year, number of days during a normal heating season, average temperature during a normal heating season, lowest temperature of record, outside design, outside design temperature and wind data for winter heating, number of hours on automatic intermittent heating plant operator, frost penetration in ground, number of degree days in a normal heating season, average maximum daily temperature for July; highest temperatures of record, relative humidity in July, probable temperatures of water in 30 to 60 ft wells, surface water and city water temperatures in summer, summer degree hours; maximum, minimum and average number of hours in a year a dry-bulb temperature exceeds temperature 85°F to 100°F, maximum wet bulb temperatures and simultaneous dry bulb and dew point temperatures and maximum dry bulb temperatures and simultaneous wet bulb temperatures at noon during July and Aug. in a six year period. The accompanying text discusses the significance of the data, the accuracy of the maps and the use of the data. *Subject Headings:* **1. Air conditioning engineers' atlas 2. Heating and ventilating 3. Climatic data.**—*I.L.D.*

9.2–39 551.582.3:551.586:63

*Daigo, Yoshiyasu, (*comp.*), **Handy atlas of agricultural meteorology in Japan.** Tokyo, Kyoritsu Pub. Co., Ltd., **1947.** 234 p. 420 figs. with English legends. Pub. under the auspices of the Society of Agricultural Meteorology of Japan. In Japanese. Title pages in Japanese and in English. **DLC**—Compilation of climatological and phenological charts for Japan proper. 267 meteorological charts showing climatic division of Japan; monthly mean air temperatures and their standard deviation; date of the highest or lowest daily minimum air temperature; first or last day of daily minimum air temperature −5°, 0°, 5°, 10°, 15°, and 20°; number of days with minimum air temperature −5°, 0°, 5°, 10°, 15° and 20°C; monthly mean temperatures at the earth's surface, 50 cm, and 100 cm underground; depth whose earth temperature does not go lower than 10°C; difference of monthly mean temperatures between the earth-surface and the air; monthly amount of evaporation; monthly amount of precipitation and its variability; monthly total numbers of rainy days and their variability; monthly total numbers of days with snowfall and their variability; date of the first or last snow; monthly total numbers of hours with sunshine and their variability; monthly total numbers of days with gale ($\geq$10m/s), monthly mean relative humidities and their standard deviation; date of the first or last frost; total number of days without hoar frost; total number of days with frost pile and 153 agricultural and phenological charts are included. *Subject Headings:* **1. Agrometeorology atlas 2. Climatic data for Japan 3. Japan.**—*H. Arakawa.*

9.2–40 551.5:63:912 551.582.3(778)

*Collier, James E. (*Asso. Prof. of Geog., Mo. Univ.*), **Agricultural atlas of Missouri.** *Missouri. Agricultural Experiment Station, Columbia, Bulletin,* No. 645, Feb. **1955.** 75 p. numerous charts (in color). **DWB** (630.84 M678a)—On p. 22 of this atlas, 10 colored isarithm charts by Wayne L. Decker are presented, with ample accompanying text, to give a general

perspective of the precip., temp., and frost regime during the different seasons in Missouri. The extremely variable nature of both precip. and temp. as one goes from southeast to northwest is clearly brought out by these charts. The precip. gradient reverses itself from spring to summer and summer to autumn. Furthermore the snowfall is the reverse of the precip. in winter: the heavy precip. in the Southeast being mostly rain and the lighter winter precip. in the northwest mostly snow, giving twice as much snow to a region that has only ¼ as much precip. *Subject Headings:* **1. Climate of Missouri 2. Agricultural atlases 3. Missouri. I. Decker, Wayne L.**—*M.R.*

9.2–41 551.510.5:551.587

*Martin, Clyde D., **Climatic handbook: a handbook of properties of the atmosphere used in design, development, and testing problems of the Navaho missile series.** *North American Aviation, Inc., Report*, No. AL-2262, May 15, **1956.** 96 p. 44 figs., 18 tables, 20 refs. **DWB**—The NACA, ICAO, Tropical and Polar standard atmospheres, the extreme hot, cold, hot stratosphere, cold stratosphere, tropical cold stratosphere and other average or extreme atmospheres are presented in tables for 1000 ft intervals or levels up to 100,000 ft and in graphs along with graphs of extreme wind speeds, etc.; temperature, pressure, density, speed of sound and other values are given. Extension of ICAO atmosphere to 435,000 ft is given as proposed. Surface and upper air climatology tables and graphs are appended for Edwards and Patrick Air Force bases (Muroc, Calif., and Cocoa, Fla.). *Subject Headings:* **1. ICAO standard atmosphere 2. NACA standard atmosphere 3. Aeronautical climatology 4. Upper air climatology 5. Muroc, Calif. 6. Cocoa, Fla.**—*M.R.*

9.2–42 551.509.3(02)

§†*Martin, Donald E., **Forecasting rules and techniques used in Tokyo Weather Central.** U. S. Air Weather Service. First Weather Wing, Tokyo, Special Study 105-2, Aug. 8, **1956.** 141 p. 2 plates, 33 figs., 26 refs., eqs. **DWB**—A substantial manual setting forth and illustrating with many synoptic examples (1955–56) the objective methods of forecasting for the Far East (at Tokyo) using the Vorticity-Space-mean anomaly techniques (developed from Rossby equation) for 500 mb charts (and auxiliary charts) leading to 1000 mb prog charts and specific forecasts for various points. Techniques for constructing and analyzing each chart are systematically presented. Evaluation of methods (verification) is also considered. Computing tables and nomograms are appended. *Subject Headings:* **1. Forecast manuals 2. Vorticity anomaly forecasting techniques 3. Rossby vorticity theory 4. Tokyo, Japan 5. Far East.**—*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

IGY

See also: **IGY geophysics program** (Fraser), 9.2–16; **Geophysical expeditions** (Migot), 9.2–19; **IGY Antarctic stations** (Kosack), 9.2–56.

9.2–43 550.3:061.3

International Geophysical Year, 1957/1958. U. S. National Committee, **Proposed United States program for the International Geophysical Year, 1957/1958.** Washington, D. C., National Academy of Sciences—National Research Council, Aug. **1956.** 109 p. tables. (*See* 7.6–20, June 1956, *MAB*, for 1955 report.) **DWB**—The tentative program for U. S. participation in IGY, as outlined in the 1955 edition, is brought up to date by inclusion of decisions of the U. S. Committee and various panels during the period Aug. 1955–Aug. 1956. The outline of the report is identical with the earlier edition except for inclusion of a section for the 180° meridian line (p. 104), and the inclusion of 150 stations in North and South America instead of 56 stations as in the 1955 edition, for the 80° 90°W line. The section on **Rockets and satellites** contains much additional information on the satellite program (p. 65–71) which had not yet been formulated in 1955 and hence was mentioned only briefly in the 1955 report. *Subject Headings:* **1. International Geophysical Year Program 2. U. S. IGY networks 3. Geophysical networks. I. Kaplan, Joseph (Chairman).**—*M.R.*

9.2–44 551.241

Tomaschek, R., **Das Internationale Geophysikalische Jahr, XI, Die Flut der festen Erde.** [The IGY Pt. 11, The tide in the solid earth.] *Umschau*, 57(21):647–650, 1 Nov. **1957.** 6 figs. **DLC**—The sun and moon can make a change of two millionths in gravity. This deforms the earth; methods of measurement are described. Oceanic tides and barometric changes affect land tides near coasts. *Subject Heading:* **1. Land tide.**—*C.E.P.B.*

9.2–45 550.3:061.3

Bulanzhe, Iu.D., **Podgotovka k mezhdunarodnomu geofizicheskomu godu.** [Preparation for the International Geophysical Year.] *Priroda*, Moscow, 45(12):111, Dec. **1956. DLC**—The first regional meeting of the countries of Eastern Europe, the Chinese People's Republic and the Mongolian People's Republic participating in the IGY was held Aug. 20–25, 1956. The actual program was discussed in detail and the feasibilities for mutual interchange of apparatus were considered. The establishment of networks of stations at World intervals, and a regional information center in Moscow receiving information from the international forecasting center near Washington and relaying information to national centers, etc., were discussed. A Soviet proposal for organizing at Novosibirsk one of the world centers for collecting and storing meteorological information obtained during the IGY was opposed. *Subject Headings:* **1. IGY program 2. Chinese participation in IGY 3. IGY networks.**—*I.L.D.*

9.2–46 550.3:061.3

M——, C. C., **The International Geophysical Year.** *Geographical Review*, N. Y., 47(3): 438–440, July **1957. DWB, DLC**—A two-page summary of the history and present Antarctic and satellite program of IGY. *Subject Heading:* **1. IGY program.**—*M.R.*

9.2–47 550.3:331 550.3:061.3

Research positions in the US-IGY Antarctic program. *Journal of Geophysical Research*, Wash., D. C., 61(1):143, March **1956. DLC**—A call for scientists, engineers and technicians with training in physics, geophysics, electronics, etc. to volunteer for either 18 or 30 months of service at Little America, the South Pole, etc. where research will be carried out in the fields of aurora, cosmic rays, meteorology, etc. Service will be from Nov. 1956–April 1958; Nov. 1957–April 1959 or from Nov. 1956–April 1959. *Subject Headings:* **1. Careers in geophysics 2. Antarctic research 3. IGY program 4. Antarctica.**—*M.R.*

9.2–48 550.3:061.3

International Geophysical Year. *American Meteorological Society, Bulletin*, 37(9):489, Nov. **1956. DWB, DLC**—Note reporting appointment of H. Wexler as Chief Scientist in charge of U. S. Antarctic efforts during the International Geophysical Year, with A. P. Crary who will head Little America station as deputy. *Subject Headings:* **1. International Geophysical Year, 1957–1958 2. Wexler, H. 3. Crary, A. P.**—*M.R.*

WMO

9.2–49 551.5:061.3

Graham, R. C., **Meteorology: a world endeavour.** *Royal Meteorological Society, Canadian Branch, (Publication)*, 7(1), Feb. 2, **1956.** 11 p. **DWB**—History of WMO and other international cooperative efforts (in Marine Meteorology, Aviation and Geophysical research); organization of WMO, observation networks, communications, codes, research, standardization, financial assistance, service to consumers in agriculture, aviation, marine fields, etc. discussed in this Presidential Lecture. *Subject Headings:* **1. WMO activities 2. International cooperation in meteorology.**—*M.R.*

9.2–50 551.5:061.3

World Meteorological Organization third session of the European Working Group on meteorological transmissions. *Meteorological Magazine*, London, 86(1022):241–243, Aug. **1957.** photo. **DWB**—Account of meeting in Utrecht April 12–18, 1957, Chairman C. V. Ockenden. Subjects included method of connecting Western and Eastern European Tele-

printer Networks and reorganization of exchange of data. Exchange of data between Europe and North America was among other subjects reviewed. *Subject Headings:* **1. World Meteorological Organization. I. Ockenden, C. V.**—*C.E.P.B.*

9.2–51 551.5:061.3

World Meteorological Organization meetings of the Aerological Commission and the Commission for Instruments and Methods of Observation, Paris, 1957. *Meteorological Magazine,* London, 86(1024):308–310, Oct. **1957. DWB**—Aerological Commission met June 18–July 5, President J. Van Mieghem. Work included organization for IGY chemical sampling of air and precipitation, and ozone network. A code was prepared for the tropopause. C.I.M.O. (June 18–July 6) covered same ground from instrumental point of view, including aerological measurements. R. C. Sutcliffe was elected President of C.Ae, A. Perlat was reelected President of C.I.M.O. *Subject Headings:* **1. World Meteorological Organization 2. W.M.O. Aerological Commission 3. W.M.O. Commission for Instruments and Methods of Measurement.**—*C.E.P.B.*

ARCTIC RESEARCH

See also: **Expedition to Beaufort Sea** (Mikkelsen), 9.2–20.

9.2–52 551.509.5:551.311.18

McGough, Raymond J. (*U. S. Navy Hydro. Off., Applied Ocean. Br., Div. of Oceanog.*), **Local environmental factors affecting ice formation in North Star Bugt, Greenland.** *U. S. Hydrographic Office, Technical Report,* No. 23, Jan. **1956.** 40 p. 24 figs., 3 tables, 4 refs. **DWB**—Environmental factors influencing the formation and growth of sea ice in the area of North Star Bugt and Wolstenholme Fjord are studied. The harbor is well situated for the use of long range ice prediction techniques based on the thermohaline structure. The formation and growth of sea ice in 1953 were studied in detail. Data indicated that the observed and computed ice thickness were nearly identical. *Subject Headings:* **1. Sea ice forecasting 2. North Star Bugt, Greenland 3. Wolstenholme Fjord, Greenland.**—*Author's abstract.*

9.2–53 91.04(98)

†Taylor, Andrew, **Geographical discovery and exploration in the Queen Elizabeth Islands.** *Canada. Dept. of Mines and Technical Surveys. Geographical Branch, Memoir,* No. 3, **1955.** 172 p. 37 figs., refs., bibliog. p. 132–161. Price: $1.00.—Geography, history before 1800, explorations of Ross, Parry and Franklin in 1818–1851 period and of other voyages in the 1845–59 era, the attempts to reach the North Pole in 1860–1909, expeditions by British, Scandinavian and Americans 1875–1940 and, finally, Canadian expeditions of 1903–1944, are detailed in separate chapters. The author bibliography is very complete. The accounts are limited to the portions of the numerous expeditions by land, sea, or air, that have to do with the Queen Elizabeth Islands (Canadian Archipelago). Meteorological aspects are only incidental. The Greely and MacGregor expeditions were the main meteorological expeditions described. *Subject Headings:* **1. Exploration of Canadian Arctic 2. Queen Elizabeth Islands, Canada.**—*M.R.*

9.2–54 551.583.2:511.311.12

Thompson, H. R. (*McGill Univ. Dept. of Geography*), **Glaciers and land forms in the Cumberland Peninsula of Baffin Island.** *Eastern Snow Conference, Proceedings,* v. 2, **1953–1954,** p. 29–34. 3 figs., 3 plates, 6 refs. **DWB**—Some results of the Baffin Island Expedition, 1953 are presented. The Pangnirtung Pass was occupied by glaciers more than 900 years ago, a glacier advance occurred about 100 years ago, and at present a decay is observed in connection with the general climatic improvement. Some notes on accumulation–ablation balance are given. *Subject Headings:* **1. Glacier retreat 2. Warming of Arctic 3. Cumberland Peninsula, Baffin Island.**—*A.A.*

9.2–55 91.04(98)

Zubov, Nikolaĭ Nikolaevich, **Russkie v Arktike.** [Russians in the Arctic.] Moscow, Pravda, **1948.** 29 p. 8 refs. At head of t-p: Vsesoiuznoe obshchestvo po rasprostraneniiu

politicheskikh i nauchnykh znaniĭ. **DLC** (G630.R8Z8)—A popular pamphlet giving some details of Russian scientific expeditions to the Arctic since the 18th century, the opening of the North Sea route, the Papanin and Sedov drift expeditions and present and future work in the Polar Basin. *Subject Headings:* **1. Arctic expeditions 2. Polar Basin.**—*M.R.*

ANTARCTIC RESEARCH

See also: **Expedition to Kerguelen** (Migot), 9.2–19; **Oceanog. data, Heard Island** (Ealey, Chittelborough), 9.2–87; **Antarctic oceanog.** (Capurro), 9.2–94.

9.2–56 551.501.9:550.3:061.3(99)

Kosack, Hans-Peter, **Forschungen in der Antarktis im Internationalen Geophysikalischen Jahr 1957/58.** [Observations in the Antarctic in the IGY 1957/58.] *Petermanns Geographische Mitteilungen*, 101(3):174–177, **1957.** chart, table. **DLC**—The main feature is a large folding map of the Antarctic, 1:7,500,000, showing observation stations for IGY, inland ice, glaciers, shelf ice, ice-free areas and contours. Subsidiary charts include sub-Antarctic islands. Recent history of discovery is given, including Theron Range. *Subject Headings:* **1. International Geophysical Year program 2. Antarctic stations.**—*C.E.P.B.*

9.2–57 551.582.1:551.594.5(265/266)

†*Law, P. G. and Burstall, T., **Macquarie Island.** *Australian National Antarctic Research Expeditions, Interim Reports*, No. 14, Sept. **1956.** 48 p. 11 plates, 5 tables, 70 refs. **DWB** (M06.5 A938i)—Macquarie Island (54½°S, 159°E) lies at a 1° higher (i.e., farther south) latitude than Heard, yet it averages 5.8°F warmer than Heard because of the warmer seas around Macquarie whereas Heard lies within the Antarctic convergence. The general climatic features of the island are covered on p. 28–35 of this monograph. Observation and research work in geomagnetism, cosmic rays, aurora and radiophysics is covered on p. 36–43. Activities are illustrated and many references to works on the region appended. The history of the island, of the station on the island and of work in each field of endeavor is outlined in detail in each separate chapter. *Subject Headings:* **1. Climate of Macquarie Island 2. Auroral observations in Antarctic 3. Macquarie Island.**—*M.R.*

9.2–58 621.396:532.59:551.46

Dowden, R. L., **Short-range echoes observed on ionospheric recorders.** *Journal of Atmospheric and Terrestrial Physics*, 11(2):111–117, **1957.** 4 figs., 2 tables, 14 refs., eq. **DWB**—Direction-finding tests at Macquarie Island showed that echoes were arriving from very low angles of elevation with vertical polarization. Echo structure, slow fading and apparent diurnal variation (probably instrumental) are described. The echoes are attributed to back scatter of surface waves by sea waves of length about $\mathbf{L} = \text{F}/2$. *Subject Headings:* **1. Radio wave distortion by ocean waves 2. Macquarie Island.**—*C.E.P.B.*

9.2–59 551.515.12:551.553:551.582(99)

Lamb, H. H., **Winds and weather in the Antarctic.** *The Advancement of Science*, 13(53): 467–476, June **1957.** 4 figs., 3 tables, 16 refs. **DLC**—Work of Hobbs on glacial anticyclones over Antarctica is criticized. Pressure is predominantly higher, but this is often over a very limited region with slack circulation between surrounding depressions. The highest pressures (1030–1036 mb) on the coast opposite Australia and in Graham Land have all occurred in blocking anticyclones. Maps of mean pressure (year and Sept.), frequencies of depressions and fronts are given, also statistics of low monthly mean pressures. In light winds under clear skies hollows are likely to produce the lowest temperatures anywhere in the world. *Subject Headings:* **1. Antarctic meteorology 2. Antarctica.**—*C.E.P.B.*

9.2–60 551.557.2(99):551.557.36

Robin, G. de Q., **Upper winds over an Antarctic station.** *Royal Meteorological Society, Quarterly Journal*, 83(358):533–537, Oct. **1957.** 3 tables, 6 refs. **DWB**—Gives seasonal mean vector winds, standard vector deviations and mean scalar speeds up to 50 mb obtained by radio-theodolite at Maudheim, 71°3′S, 10°56′W, April 1950–Jan. 1952. Means and

S.V.D.'s are discussed and compared with those for Tromsö and circle 70°N. *Subject Headings.* **1. Upper air winds 2. Maudheim, Antarctica.**—*C.E.P.B.*

9.2–61 551.5:91.04(99)

Walton, Eric William Kevin, **Two years in the Antarctic.** New York, Philosophical Library, **1955.** 194 p. figs., tables, numerous photos. **DLC** (GC890.P3W3), **DWB** (919.9 W238t)—A popular narrative of the life during the phase of the Falkland Island Dependencies Survey in which the author participated during Nov. 1945–May 1948, when bases were established on Graham Land. The bases, expeditions by land and sea, and surveyed areas are shown on charts. Details of setting up bases, clothing, observational problems by 2 meteorologists (WILLIE SALTER and MACCHOYCE), establishment of station on plateau, aircraft reconnaissance and of the weather itself are included. An excellent library of popular and scientific polar literature is said to have contributed tremendously to the success of the work. *Subject Headings:* **1. Antarctic bases 2. Falkland Island Dependencies Survey 3. Graham Land.**—*M.R.*

OBSERVATORIES AND SERVICES

See also: **Lamont Geological Observatory** (Ewing, Heezen), 9.2–85.

9.2–62 551.501.9(411):551.43

Reynolds, G. and Champion, Donald L., **The utilitarian aspect of research.** *Weather,* 12(11):360, Nov. **1957. DWB**—REYNOLDS argues that reestablishment of Ben Nevis Observatory would serve no useful purpose and would be idle and wasteful. CHAMPION favors reestablishment. *Subject Heading:* **1. Ben Nevis Observatory.**—*C.E.P.B.*

9.2–63 550.3

Hultqvist, Bengt, **The Kiruna Geophysical Observatory, Sweden.** *Nature,* London, 180(4591):828–830, Oct. 26, **1957.** 4 figs. **DWB**—Formally opened July 2, 1957, in presence of more than 100 guests; 67°8′N, 20°4′E. Equipment includes a Stoffregen all sky auroral camera and a panoramic radiosonde. *Subject Headings:* **1. Geophysical observatories 2. Kiruna, Sweden.**—*C.E.P.B.*

9.2–64 551.579

Nelson, G. H., **Hydraulic Laboratory research facilities of the State Water Survey Division.** *Illinois. Dept. of Registration and Education, Circular,* No. 48, **1955.** 15 p. 10 figs. (incl. photos), 111 refs.—State water survey established in 1917, has two laboratories; at Urbana and at Peoria. Part of the research is concerned with the continuous measurement of evaporation and precipitation, partly by help of radar. The list of publications shows a number of studies on hydrology, rainfall statistics, evaporation records, atmospheric moisture, radar and rainfall, thunderstorms, etc. *Subject Headings:* **1. Hydrometeorological services 2. Hydrology studies 3. Radar precipitation studies 4. Illinois.**—*A.A.*

9.2–65 551.501.9(09,47)

R——, A——, **Siedemdziesięciopięciolecie Meteorologicznego Observatorium im. W. A. Michelsona.** [Seventy-fifth anniversary of the V. A. Michelson Meteorological Observatory.] *Przegląd Meteorologiczny i Hydrologiczny,* Warsaw, 7(1/2):80, **1954. DWB, DLC**—The Meteorological Observatory of the Moscow Academy of Agriculture was organized by Prof. A. A. FADEEV in 1879. From 1895 to 1898 the observatory controlled the "Central Russian network of agriculture meteorological stations" organized by MICHELSON in 10 central provinces adjoining Moscow. MICHELSON, during his directorship (which ended with his death in 1927), organized actinometric observations using an instrument he invented (the Michelson actinometer is still widely used in the U.S.S.R.). The program of meteorological courses has been greatly enlarged since 1953 when a department of agricultural meteorology was started. *Subject Headings:* **1. History of observatories 2. V. A. Michelson Meteorological Observatory 3. U.S.S.R.**—*A.M.P.*

9.2–66 523.7(54)

Das, A. K., **Kodaikanal Observatory.** *Nature*, London, 170(4315):55–56, July 12, 1952. **DLC**—Astrophysical observatory 7688 ft above M.S.L. in Palni Hills founded March 1901 in continuation of Madras Observatory (1792). Work mainly spectroscopic; magnetic work since 1949 and ionospheric since beginning of 1952. *Subject Headings:* **1. Astrophysical observatories 2. Kodaikanal, India.**—*C.E.P.B.*

9.2–67 523.7

Dobronravin, P. P. and Pikel'ner, S. B., **Novye raboty Krymskoĭ Astrofizicheskoĭ Observatorii.** [The present work of the Crimean Astrophysical Observatory.] *Priroda*, Moscow, 7:50–56, July **1953.** illus., refs. **DLC**—The establishment of this observatory dates back to 1900, but it was not until 1925 that a large (reflector type) telescope was installed. Work of the observatory is described in detail and equipment illustrated. The work on solar physics (photography of the chromosphere, spectrography of various parts of the sun, ionospheric studies) and other astrophysical investigations conducted in this observatory are discussed. *Subject Headings:* **1. Astrophysical observatories 2. Crimea, U.S.S.R.**—*M.R.*

CONFERENCES AND SYMPOSIA

See also: **Agrometeorology Conf.,** 9.2–2; **Arid zone research symposia,** 9.2–4; **Atmos. pollution symposia,** 9.2–5; **Weather Radar Conf., 6th,** 9.2–6; **Conf. on meteorological transmissions,** 9.2–50; **WMO Aerological Commission meeting,** 9.2–51; **Conf. on Ionization phenomena** (Garton, Latham), 9.2–265.

9.2–68 551.574.1(08)

Dessens, Henri, **Compte rendu du 2e Symposium sur Les Noyaux de Condensation, Bâle et Locarno, 1–4, Oct. 1956.** [Proceedings of the second Symposium on Condensation Nuclei, Basel and Locarno, Oct. 1–4, 1956.] *Puy de Dôme. Observatoire, Bulletin, Sér. 2*, No. 4:152–156, Oct./Dec. **1956. DWB**—A long summary of the proceedings of the Basel and Locarno Conference on condensation nuclei Oct. 1–4, 1956, and a brief summary of each of a score of contributions. Some progress was shown to have been made since the Dublin Conference of 1955. *See also:* Podzimek, Josef, **II Mezinárodní symposium o atmosférických kondensačních jádrech, Basilej-Locarno, 1–4 října 1956.** [Second International Symposium on Atmospheric Condensation Nuclei, Basel and Locarno, Oct. 1–4, 1956.] *Meteorologické Zprávy*, Prague, 10(3):59, **1957.** *Subject Headings:* **1. Condensation nuclei symposia 2. Basel, Switzerland 3. Locarno, Switzerland.**—*M.R.*

9.2–69 551.509.67:061.3

†Dessens, H., **Les bases scientifiques des recherches sur la modification du temps: suite du compte-rendu de la Conférence de Tucson.** [Scientific bases for research on weather modification: continuation of the Tucson Conference proceedings.] *Puy de Dôme. Observatoire, Bulletin, Sér. 2*, No. 3:88–94, July/Sept. **1956. DWB**—Summaries of 18 papers presented at the Tucson Conference are provided. The most important is a long summary of a seminar on statistical evaluation of different cloud seeding programs for production of rainfall of practical value, which session is referred to as a "bataille de nuit." Out of 35 participants who were asked if McDonald's report was too pessimistic, only 2 said it was, whereas 25 thought it was not too pessimistic. Godson, Brier, Brownlee, Neuman, Woodbury and Thom presented reports at this session. *Subject Headings:* **1. Cloud Seeding Conference, Tucson, Ariz., 1956 2. Statistical tests of cloud seeding 3. Cloud seeding evaluation 4. Tucson, Ariz.**—*M.R.*

9.2–70 551.574.1:551.576.7:061.3

Dessens, H., **Le meeting de Londres sur la Physique des Nuages 4–5 janvier 1956.** [The Cloud Physics Conference at London, Jan. 4–5, 1956.] *Puy de Dôme. Observatoire, Bulletin, Sér. 2*, No. 1:11–14, Jan./March **1956. DWB**—A summary of the ideas presented by Junge, Weickmann, Mason, Dessens, Turner (Australia), Braham, Ludlam, Sawyer, Marshall (Canada) and Wormell on various aspects of cloud physics at the London symposium on Cloud Physics. The meeting was attended by 100–150 from many countries and also by a

remarkable display of smog which could be smelled even indoors and in subways where the fog part was dissipated. *Subject Heading:* **1. Cloud Physics Conference, London, Eng. Jan. 1956.**—*M.R.*

9.2–71 551.515.2(08)

Hilder, Brett, **International Symposium on Tropical Cyclones held at Brisbane, Queensland, 10th–14th December 1956.** *Marine Observer*, 27(178):215–218, Oct. **1957.** photo, ref. **DLC**—The President of the Australian Institute of Navigation gives a simplified account of the symposium, especially methods of forecasting tracks. Radar photographs from aircraft and sea level are described. Aircraft can fly over or round a hurricane and fix positions, forecasting paths and giving warning to coastal ports. *Subject Headings:* **1. Tropical cyclones 2. Symposia.**—*C.E.P.B.*

9.2–72 551.515.2(08)

Cowan, J. L. B. and Hilder, Brett, **A tropical cyclone symposium.** *Institute of Navigation, London, Journal*, 10(4):423–427, Oct. **1957. DWB, DLC**—Cowan gave a short account of proceedings at symposium at Brisbane, Dec. 10–14, 1956. Hilder divided the work into practical—gathering data, including radar—and theoretical—analyzing situations. Investigations by aircraft and microseisms and forecasting of tracks were described. *Subject Headings:* **1. Tropical cyclones 2. Symposia.**—*C.E.P.B.*

EDUCATION, HISTORY AND BIOGRAPHY

EDUCATION

9.2–73 551.5:373

Green, S. W., **The place of meteorology in liberal education.** *Weather*, 12(10):301–310, Oct. **1957. DWB**—Second prize winner in Roy. Meteor. Soc. competition. Climate and weather influence human emotions, but there are many popular fallacies, and meteorology is taught in few schools, because it lacks "practical" value and is not an examination requirement. Meteorological observation should be developed as part of the Geography course; barograms should be associated with weather, and a summary of weather conditions made over the years. Exchange of information and preparation of synoptic charts are also proposed. A 3-year course is outlined. *Subject Heading:* **1. Teaching of meteorology.**—*C.E.P.B.*

HISTORY

See: **History of observatories, 9.2–65.**

BIOGRAPHY

See also: **Voeĭkov's contribution to climatology** (Budyko, *ed.*), **9.2–8.**

9.2–74 551.5:92

Nyberg, A., **[Obituary of] Professor C.-G. Rossby.** *World Meteorological Organization, WMO Bulletin*, 6(4):157–158, Oct. **1957** photo. Also: Mason, B. J. **[Obituary note on] Professor Carl-Gustaf Rossby.** *Weather*, 12(11):351, Nov. **1957. DWB**—Died Aug. 19, 1957, in Stockholm, aged 59. "The impressive developments in meteorology during the last twenty years may be closely identified with ROSSBY's career in which he so often provided the ideas necessary for progress." Three outstanding university departments of meteorology—M.I.T., Chicago and Stockholm, grew up under his direction. *Subject Headings:* **1. Obituaries 2. Rossby, C.G.**—*C.E.P.B.*

9.2–75 551.5:92

Wordie, J. M., **[Obituary note on] Prof. H. U. Sverdrup.** *Nature*, London, 180(4594):1023, Nov. 16, **1957.** Also: Brooks, C. F., **[Obituary of] Harald Ulrich Sverdrup.** *American Meteorological Society Bulletin*, 38(8):486, Oct. **1957.** Also: **[Obituary note on] Professor H. U. Sverdrup.** *World Meteorological Organization, WMO Bulletin*, 6(4):158, Oct. **1957.**

Also: [obituary note] in *Weather*, 13(1):17, Jan. **1958. DWB**—Born Nov. 1888. Studied Leipzig 1913–17. Leader of research in Maud expedition under Amundsen 1917–1923. Professor of Meteorology in Geophysical Institute, Bergen, 1926–31. Professor in University of California 1936–48. Professor of Geophysics in Oslo 1949 onwards. Died Aug. 21, 1957. *Subject Headings:* **1. Obituaries 2. Sverdrup, H. U.**—*C.E.P.B.*

9.2–76 551.5:92

Reuter, H., [**Obituary of**] **Prof. Dr. Heinrich Ficker.** *Royal Meteorological Society, Quarterly Journal*, 83(358):565, Oct. **1957.** Also his article in *Geofisica Pura e Applicata*, Rome, 37:325–326, **1957.** Also: Konček, Mikuláš, **Za Profesorom Dr. H. Fickerom** [Obituary]. *Meteorologické Zprávy*, Prague, 10(4):85–86, **1957.** photo. Also: Flohn, H., [**Obituary note on**] **Heinrich W. Ficker.** *Petermanns Geographische Mitteilungen*, 101(4):272, **1957.** Also: Dési, F., [**Obituary of**] **Heinrich Ficker, 1881–1957.** *Időjárás*, 61(3):219–220, May/June, **1957.** Ger. version p. 236–237. Also: Bilancini, R., **Heinrich Ficker.** *Rivista di Meteorologia Aeronautica*, 18(1):523, Jan./March **1958. DLC**—Born Munich 1881, died Vienna April 29, 1957. Studied meteorology at Innsbruck, Professor at Graz 1911. Participated in the German Expedition to Pamirs in 1913. Captured by the Russians during World War I. University of Berlin and Director of Prussian Meteorological Service 1923–1937. Director of Austrian Meteorological Service and Professor at Vienna 1937–1953; President of the Vienna Academy of Science, 1946–1951. Preceded the Bergen School (1910) in air mass and frontal analysis, and was a pioneer in many other practical fields of synoptic meteorology. Wrote more than 140 works, including numerous papers on föhn studies, cold air outbreaks over Russia, development of depressions, etc. *Subject Headings:* **1. Obituaries 2. Ficker, H.**—*C.E.P.B.*

9.2–77 551.5:92

Blum, Victor J., [**Obituary of**] **James Bernard Macelwane, S.J.** *American Geophysical Union, Transactions*, 37(2):135–136, April **1956.** photo. Also: [**Obituary of**] **James B. Macelwane.** *American Meteorological Society Bulletin*, 37(4):151, April **1956. DWB, DLC.** Also: **Macelwane honored posthumously.** *American Geological Institute, Geological News Letter*, 7(9):5, March **1956. DGS.** Also: Labrouste, Y., **Nécrologie** [**of**] **James Bernard Macelwane, S.J.** *Annales de Geophysique*, 12(1):57–58, Jan./March **1956. DLC**—Born Sept. 28, 1883 near Port Clinton, Ohio. M.S. in Physics in 1912. First technical paper (on seismographs) in 1911. Received Ph.D. at University of California in 1923. In charge of seismographic work at Berkeley and Mt. Wilson, 1923–5. Professor of Geophysics at St. Louis Observatory from 1925–1956. Active in Research and Development Board, National Science Foundation, International Geophysical Year Panel for Seismology, etc. Wrote 133 technical papers, received William Bowie Medal in 1948, and was president of the American Geophysical Union from 1953–56. Received 4 honorary degrees. Died Feb. 15, 1956. *Subject Headings:* **1. Obituary of James Bernard Macelwane 2. Macelwane, J. B.**—*M.R.*

9.2–78 551.5:92:012

†Pelzl, E., **In memoriam Prof. Dr. Willi König.** *Zeitschrift für Meteorologie*, Berlin, 11(4):100–104, April **1957.** photo. 53 refs. **DLC**—Born Nov. 2, 1884, in Kloster Vessra, educated Schleusinger and Universities of Marburg and Berlin. Joined Prussian Weather Service 1906. In 1934, with nationalization of German Weather Services, transferred to Deutsche Seewarte, Hamburg, 1936 Dresden, 1938 Munich, 1940 back to Berlin as Director of Weather Service School. In 1953 lectured in meteorology at Berlin University. Died Oct. 31, 1955. List of 53 works extends from 1907 to 1955. *Subject Headings:* **1. Obituaries 2. König, W.**—*C.E.P.B.*

9.2–79 551.5:92

König, W., **Zur 100. Wiederkehr des Geburtstages von Gustav Hellmann.** [On the 100th anniversary of Gustav Hellmann.] *Zeitschrift für Meteorologie*, 8(7/8):193, July/Aug. **1954. DWB, DLC**—HELLMANN's achievements in meteorology and climatology and his significance in the development of these services are evaluated. A portrait of HELLMANN is reproduced. *Subject Headings:* **1. Biography 2. Hellmann, Gustav.**—*I.L.D.*

BIBLIOGRAPHY

9.2–80 551.5:016

†**List of publications which were brought from Tempelhof to Bad Kissingen in November 1949.** (Letter accompanying transmittal of inventory, signed Kenneth M. Barnett, dated May 27, 1952, Office of the U. S. High Commissioner for Germany, Scientific Research Div., Landeshaus, Wiesbaden.) 184 p. Mimeo. **DWB** (M016 L773)—A large catalog of hundreds of publications of every type which were moved to Bad Kissingen in 1949. (*See also* 8.10–264, Oct. 1957, *MAB.*) *Subject Headings:* **1. Library catalogs 2. Bibliographies 3. Bad Kissingen, Germany. I. Germany. Reichsamt für Wetterdienst. Bibliothek II. Germany. Deutscher Wetterdienst in the US-Zone.**—*M.R.*

APPLIED METEOROLOGY

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **Hydrography of straits** (Zubov), 9.2–14; **Radio wave distortion by ocean waves** (Dowden), 9.2–58; **Met. buoy,** 9.2–155; **Wave run-up** (Savage), 9.2–195; **Hurricane track-sea temp. relationships** (Fisher), 9.2–197.

9.2–81 551.46(265/266)

†***Oceanic observations of the Pacific, 1949.** Berkeley, University of California Press, **1957.** 363 p. 6 charts, 38 refs. Almost entirely tables. Price: $4.50. "A volume will be issued that will contain hitherto unpublished observations made prior to 1949. Subsequent volumes will contain observations in each succeeding year, to appear irregularly as they are completed." Contributing agencies in the 1949 issue: Scripps Institution of Oceanography; Dept. of Oceanography of Univ. of Washington (Seattle); U. S. Navy Electronics Lab. (San Diego) and Pacific Oceanic Fishery Investigations of the U. S. Fish and Wildlife Service (Honolulu). **DLC** (GC57.O25). Review by D. Rochford in the *Australian Journal of Science*, 20(5):153–154, Dec. **1957.**—Temperature, salinity, oxygen, density, specific volume and other observed and derived data obtained during 1949 cruises of the above oceanographic institutions are tabulated and the routes and positions of oceanographic stations as well as of bathythermograph observations in the Pacific and Indian Oceans shown on charts. The data are presented in a uniform manner easily legible and fully annotated. *Subject Headings:* **1. Oceanographic data for Pacific Ocean 2. Oceanographic cruises in Pacific 3. Pacific Ocean I. California. Univ. Scripps Institution of Oceanography II. Rakestraw, Norris W.** (*ed.*).—*M.R.*

9.2–82 551.582(261,44,46):656.61

*Great Britain. Hydrographic Office, **Bay of Biscay Pilot comprising the west coast of France and the north coast of Spain from Pointe de Penmarc'h to Caho Ortegal.** 4th ed. London, **1956.** p. liii+391. 61 plates, tables.—Contains the usual climatological tables for ports. **Meteorology** p. xxxviii–liii, 27–43. *Subject Headings:* **1. Sailing directions 2. Local climatology 3. Bay of Biscay.**—*C.E.P.B.*

9.2–83 551.571:629.123.5

Shellard, H. C., **The application of meteorology to the care of cargo in a ship's hold.** *Marine Observer*, 27(178):218–228, Oct. **1957.** 3 figs., table, 2 refs. **DLC**—Cargo damage includes effects such as moulding, germination of grain, corrosion of metals, caking of sugar or chemicals, etc. Classified as "hold sweat" and "cargo sweat." Physical principles of ventilation are to remove excess moisture before it can do any damage and to avoid introduction of such moisture into ventilating stream. A dew point table for use with aspirated thermometers is given. Many cargoes of an organic nature are hygroscopic, and should be shipped with as low a moisture content as possible and ventilated whenever possible. Hygroscopic and non-hygroscopic cargoes should not be mixed in the same hold. Recommended procedure is set out with examples. *Subject Headings:* **1. Cargo protection 2. Ships' hold climates.** —*C.E.P.B.*

9.2–84 532.59:551.46

Walden, H., **Etwas über die Dünung.** [About swell.] *Wetterlotse*, No. 123:217–220, Oct. **1957.** fig. **DLC**—By contrast with wind sea even a high swell is not dangerous, but can delay journeys and increase the danger from high wind seas. Examples of swell that have travelled long distances are quoted, including Falkland Is.–Cornwall. *Subject Heading:* **1. Ocean swell.**—*C.E.P.B.*

9.2–85 551.46

†Ewing, Maurice and Heezen, Bruce C. (*both, Lamont Geological Observatory*), **Oceanographic research programs of the Lamont Geological Observatory.** *Geographical Review*, N. Y., 46(4):508–535, Oct. **1956.** 13 figs. (incl. photos), 2 tables, 69 refs. **DWB, DLC**—The principal research projects in the research program are listed and described; these include seasonal reflection and refraction measurements, gravity measurements, photography of the ocean floor, ocean-bottom topography, sediment and rock sampling, deep water circulations, and seismology. The Columbia University oceanographic cruises are listed. The results of studies on the morphology of the ocean floor, on pelagic sedimentation, slumps and turbidity currents, ripple marks, lithology and stratigraphy on earthquake seismology, on magnetic field measurements, etc., are presented. *Subject Headings:* **1. Oceanographic research 2. Columbia Univ. Lamont Geological Observatory.**—*I.L.D.*

9.2–86 551.553.8(261)

Rodewald, M., **Schwankungen der monatlichen Sturmhäufigkeit auf dem Nordatlantik (Fortsetzung und Schluss).** [Variations of the monthly storm frequency on the North Atlantic (continuation and conclusion).] *Wetterlotse*, No. 123:209–217, Oct. **1957.** 7 tables. **DLC**—Continuation of No. 122:197–200, Sept. 1957. Ocean Weather Ship D (44°N, 41°W) has greatest storm frequency, with 48% in Dec. 1955 and 52% in Feb. 1957. April and May are still very stormy. Other O.W.S.'s in North Atlantic are compared. *Subject Headings:* **1. Storm frequency 2. Ocean Weather Ships 3. North Atlantic.**—*C.E.P.B.*

9.2–87 551.506.5(94):551.46

†*Ealey, E. H. M. and Chittelborough, R. G., **Plankton, hydrology and marine fouling at Heard Island.** *Australian National Antarctic Research Expeditions, Interim Reports*, No. 15, Sept. **1956.** 81 p. 20 figs., tables, bibliogs. throughout. **DWB** (M06.5/94 A938i)—Contains data on salinity, air and water temperatures, etc. at Heard Island (53°S, 73°23'E) for 1949–50, as well as other oceanographic data related to naval operations at that place. Regional and seasonal variations in oceanographic conditions are also considered. Ice pack comes to 58°S in Sept.–Oct. (and 67°S in March) so reports of ice blink in winter of 1948 and snowy petrels in Aug. 1948 at Heard Island could be believed. The pack ice might, at times, even reach Heard Island. *Subject Headings:* **1. Oceanographic data 2. Heard Island.**—*M.R.*

9.2–88 551.46

Fleming, Richard H. (*Univ. of Washington, Seattle*), **The impact of oceanography on other sciences.** *Journal of Marine Research*, New Haven, Conn., 14(4):337–343, **1955. DWB, DLC**—Oceanography is defined as the study of the oceans and their relation to man. The wide scope of oceanography as a discipline and its relation to other scientific disciplines is stressed. The objectives of oceanography—the study of the boundary of the ocean, the study of inland waters (Washington state, for example), behavior and distribution of marine organisms, the prediction of storm waves, etc.—are reviewed briefly. *Subject Heading:* **1. Oceanography.**—*I.L.D.*

9.2–89 551.464:546.13:546.32

Jentoft, Ralph E. and Robinson, Rex J. (*both, Univ. of Washington, Seattle*), **The potassium-chlorinity ratio of ocean water.** *Journal of Marine Research*, New Haven, Conn., 15(2):170–180, Nov. **1956.** 3 tables, 15 refs., 5 eqs. **DWB, DLC**—A method for determining the amount of potassium in ocean water has been described. With this procedure, a number of ocean water samples have been analyzed for potassium, and the potassium-chlorinity ratios have been calculated. The ratio has been found to have a constant value of 0.02023 with a standard

deviation of 0.000,032 or 1.6 parts per 1000. *Subject Headings:* **1. Oceanographic chemistry 2. Potassium-chlorinity of ocean water.**—*Authors' abstract.*

9.2–90 551.46

*Ching, Chen-Hua (*Dept. of Oceanography, Shantung Univ.*), **On the accuracy in the determination of the salinity, temperature and depth of sea water in relation to the calculation of its density in shallow sea hydrographical survey.** *Acta Geophysica Sinica,* (Peking?), 4(1):25–33, **1955.** tables, 4 refs., 21 eqs. In Chinese; Eng. summary p. 30–31.—Discusses accuracy of salinity, temp., and density measurements or determinations for hydrographical surveys in the China Sea (where salinity ranges from 23.50 to 34.33$_{0/00}$ and temp. from 5°C to 33°C and depth or pressure from 0 to 100 decibars). Salinity values must be <0.01$_{0/00}$, temp. accuracy must increase with increasing temp. (0.03°C in upper and 0.10°C in lower layers). Depths must be accurate to 2.2 m. *Subject Headings:* **1. Oceanographic measurement accuracy 2. Hydrographic surveys of China Sea 3. China Sea.**—*M.R.*

9.2–91 551.526.6(711)

*Tabata, Susumu (*Fisheries Res. Board of Canada*), **Classification of daily sea-water data.** *American Geophysical Union, Transactions,* 38(2):191–197, April **1957.** 3 figs., 4 tables, 14 refs. **DWB, DLC**—A method is presented for classifying daily observations of sea-water temperature and salinity at five light stations along the coast of British Columbia. In order to summarize the large masses of data collected during the 15 years, 1940–1954, the monthly means are compared to the grand monthly means by passing them through a step filter whose jumps are chosen from integral multiples of the standard deviations. Examples of the use of this classification are also shown. *Subject Headings:* **1. Diurnal sea temperature variations 2. Sea temperature classification 3. British Columbia coast.**—*Author's abstract.*

9.2–92 551.556.8:551.468

Tickner, E. G., **Effect of bottom roughness on wind tide in shallow water.** *U. S. Beach Erosion Board, Technical Memorandum* No. 95, May **1957.** 25 p. 17 figs., 15 refs., 9 eqs. **DWB, DLC**—Wind tide and wave conditions in shallow water were studied in a laboratory channel with a rough bottom. Common window screen arranged in strips 0.10 foot in height, across the channel was used to simulate a vegetative roughness as often found in shallow lakes and bays. Data on water flow and wave action are presented as functions of wind speed, depth of water and bottom roughness. *Subject Headings:* **1. Wind tides 2. Bottom relief effects 3. Shallow water waves.**—*From author's abstract.*

9.2–93 551.521.3:551.46

Burt, Wayne V. (*Johns Hopkins Univ., Chesapeake Bay Inst.*), **Interpretation of spectrophotometer readings on Chesapeake Bay waters.** *Journal of Marine Research,* New Haven, Conn., 14(1):33–46, **1955.** 5 figs., table, 20 refs., 8 eqs. **DWB, DLC**—Numerical results of the Mie theory of scattering of light energy by suspended particles have been applied to light extinction measurements obtained from waters of Chesapeake Bay and its major tributaries. A Beckman Model DU Quartz Prism Spectrophotometer with 10 and 50 cm liquid absorption cells was used on raw and filtered samples to determine the extinction as a function of wave length. Extinction in these waters is primarily due to absorption and scattering by suspended materials. Application of theory to observed data indicates that a large share of the particles that cause the extinction are less than one micron in radius and that these particles occur in concentrations ranging from less than one to approximately 60 ppm by volume. *Subject Headings:* **1. Extinction 2. Mie theory 3. Chesapeake Bay.**—*Author's abstract.*

9.2–94 551.46(99)

Capurro, Luis R. A., **Aspectos oceanográficos de la Antártida Argentina.** [Oceanographic aspects of the Argentine Antarctic.] *Sociedad Científica Argentina, Anales,* 162(1/2):14–34, July/Aug. **1956.** 8 figs., 16 refs. **DLC, DWB**—Charts and vertical cross sections show conditions of temperature, salinity, density, currents, convergence areas, submarine topography and other features of Antarctic Seas. Expeditions, ice and other physical-chemical oceanographic conditions are discussed at some length. Water masses and circulation of surface and deep

waters are given special attention. *Subject Headings:* **1. Antarctic oceanography 2. Oceanographic cross sections 3. Antarctic Seas.**—*M.R.*

9.2–95 551.515.2:551.556.8:551.465

*Wilson, Basil W., **Hurricane wave statistics for the Gulf of Mexico.** *U. S. Beach Erosion Board, Technical Memorandum*, No. 98, June **1957.** 61+34 p. 43 figs., tables, 17 refs., eqs. **DWB**—This report contains the results of a statistical hindcast study of the heights and periods of significant waves generated by hurricanes in the Gulf of Mexico in the period 1900 to 1949. Results are presented in a series of polar plots of frequencies of occurrence of waves of given height and period at deep-water stations at different bearings offshore from five coastal stations (Brownsville, Tex.; Gilchrist, Tex.; Burrwood, La.; Apalanchicola and Tampa, Fla.). Maximum wave heights are correlated with hurricane characteristics and probability distributions are worked out. *Subject Headings:* **1. Wave height and period statistics 2. Hurricane waves 3. Gulf of Mexico.**—*From author's abstract.*

ASTRONAUTICS—SATELLITE OBSERVATORIES

9.2–96 551.507.362:629.19

*Singer, S. Fred, **Meteorological measurements from a minimum satellite vehicle.** *American Geophysical Union, Transactions*, 38(4):469-492, Aug. **1957.** 18 figs., 2 tables, 26 refs. **DWB, DLC**—A satellite lends itself ideally to the worldwide measurement (1) of the Earth's visible albedo (that is, scattered and reflected sun light), (2) of the infrared emission from the Earth and its atmosphere, and (3) of the altitude distribution of ozone. The present paper specifically does not discuss measurements of solar and other extraterrestrial radiations although it is realized that ultimately they may be of major importance. The satellite problems are first discussed: A polar orbit is to be preferred. It is necessary for the satellite to be at least partly oriented; for certain orbits a simple spin orientation is sufficient. The detector problems for the ozone, infrared, and visible are treated in detail. At the present state of the art considerations of weight, and also storage and telemetering problems speak against the use of television. It is demonstrated, however, that the resolution attainable with a minimum satellite and simple detectors is adequate for the following applications: (1) a more accurate determination of the global heat balance and the general tropospheric circulation patterns; (2) long-term albedo changes and their relation to climatic changes; (3) synoptic albedo measurements and the tracking of the development and motion of storm centers; (4) gathering of information which can be correlated with the generation of waves superimposed on the general atmospheric circulation, leading therefore to improved long range weather predictions; (5) determination of variations of the vertical ozone distribution, and resulting applications to stratospheric wind systems, upper troposphere advection and vertical transport phenomena. *Subject Headings:* **1. Satellite observatories 2. Satellite instrumentation 3. Satellite orbits.**—*Author's abstract.*

9.2–97 551.507.362

Davis, R. J.; Whipple, F. L. and Zirker, J. B. (*all, Harvard College Obs.*), **The orbit of a small earth satellite.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 1–22. fig., table, 11 refs., 81 eqs.) **DWB, DLC** (QC807.5.V3)—This paper considers the motion of a small artificial satellite of the earth launched into an inclined, moderately eccentric orbit from a point approximately 500 km above sea level. It discusses in detail the effects on the desired initial orbit produced by small deviations from the desired launching conditions, and perturbations produced by the earth's oblateness and atmospheric drag. Additional minor perturbations are discussed qualitatively. These additional perturbations include the action of the sun and moon, variations of the density of the upper atmosphere with time and latitude, Bernoulli forces acting on a spinning object, and the effect of upper-atmospheric winds, including the westerly wind produced by the earth's rotation. The appendix contains an explanation of all symbols used in the paper. *Subject Heading:* **1. Satellite orbits.**—*Authors' abstract.*

9.2–98 551.507.362:550.38

Heppner, J. P. (*U. S. Naval Research Lab., Wash., D. C.*), **Satellite geomagnetic measurements.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 234–246. fig., table, ref., eq.) **DWB, DLC** (QC807.5.V3)—Measurements of the total solar magnetic field from a satellite above the densely ionized regions of the upper atmosphere could, in theory, answer or help answer a number of important questions concerning geomagnetic storms and other disturbances. Here, the practical requirements and techniques for obtaining useful data are examined. *Subject Heading:* **1. Satellite geomagnetic measurement.**—*Author's abstract.*

9.2–99 629.19:621.396.9

Cambridge, England. Mullard Radio Astronomy Observatory, **Radio observations of the Russian earth satellite.** *Nature*, London, 180(4592):879–883, Nov. 2, **1957.** 9 figs., 2 refs. **DWB**—Interferometer observations of track on 20, 40 and 80 Mc/s are described and an approximate orbit derived. Variations in intensity of received signal were due to various causes. Presence of a transmitter at varying zenith angles and various heights offers new methods of ionosphere investigation and preliminary results have been obtained. Estimates of density of atmosphere etc. were also made. *Subject Headings:* **1. Satellite observatories 2. Radio satellite tracking.**—*C.E.P.B.*

9.2–100 551.507.362

Der erste Erdsatellit. [The first earth satellite.] *Naturwissenschaftliche Rundschau*, 10(11):424–425, Nov. **1957.** 2 figs. **DWB**—Account of satellite launched on Oct. 4, 1957, tracks and structure of radio signals. There is a brief reference to second satellite, which will record ultraviolet solar spectrum, cosmic rays, measurements of earth's surface and sun's magnetic field. *Subject Heading:* **1. Satellite observatories.**—*C.E.P.B.*

9.2–101 551.507.362:629.19

Hudson, Donald E. (*Inst. for Atomic Res., Iowa State College, Ames*), **Possibility of visual tracking of a satellite.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 39–43. 6 refs.) **DWB, DLC**—It is suggested that visual tracking of the satellite at night may be feasible by means of short flashes of light. A point source having an intensity of about 400 candle-sec would give a flash barely visible to the naked eye under good viewing conditions. Energy for 10,000 such flashes from a xenon discharge tube can be supplied by about 8 lbs of commercially available batteries and condensers in a total volume of less than 100 in. A weaker source suitable for telescopic tracking could weigh of the order of 1 lb. In addition to supplementing the local oscillator, a flasher could provide a valuable beacon in case of transmitter failure. *Subject Headings:* **1. Satellite tracking 2. Xenon discharge tube.**—*Author's abstract.*

9.2–102 551.510.3:551.507.362:629.19

Jones, L. M. and Bartman, F. L. (*Engr. Res. Inst. and Dept. of Aeronautical Engr., Univ. of Michigan, Ann Arbor*), **Satellite drag and air-density measurements.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 85–98. 8 figs., table, 2 refs., eq.) **DWB, DLC**—The problems of obtaining density values at satellite altitudes from drag measurements on the satellite are discussed. Tracking measurements alone will yield only average densities over many orbits. In the final high-drag phase, the distance over which the density average is taken will be somewhat less but will be at lower altitudes. Instantaneous measurements of drag with an accelerometer will permit synoptic measurements of density or improve the precision of average density measurements. Results early in the life of the satellite will be possible, thus increasing the probability of obtaining results. A 5-lb, 5-ft-diameter inflated sphere is proposed. It would carry an improved version of the transit-time accelerometer used in Michigan sphere-drop density experiments. The required improvement in accelerometer performance and such problems as inflation, active satellite life, and ground stations are discussed. *Subject Headings:* **1. Satellite air density measurement 2. Satellite drag.**—*Authors' abstract.*

9.2–103 551.507.362:629.19:551.508.25:551.521.64

Ludwig, George H. and Van Allen, James A., **Instrumentation for a cosmic ray experiment for the minimal earth satellite.** *Journal of Astronautics*, N. Y., 3(3/4):59–60, 80, **1956.** 4 figs., table, ref. **DLC**—A single Geiger counter and a system for storing output on magnetic tape is designed for use in satellite to study space and time variations of primary cosmic ray intensity. Information on geomagnetic fields, in cosmic ray albedo, etc. will thus be available. Details of units, system and records are illustrated and specifications tabulated. *Subject Headings:* **1. Satellite cosmic ray recorders 2. Satellite cosmic ray observation.**—*M.R.*

9.2–104 551.507.362:629.19

Porter, R. W. (*General Electric Co., N. Y.*), **Recovery of data in physical form.** *Franklin Institute, Phil., Journal of the Franklin Institute Monographs*, No. 2:103–115, June **1956.** 11 figs. **DWB**—Discussion of the two main problems in recovery of satellite data: 1) extreme temperatures, and 2) locating the capsule. The problem must be solved without adding a lot to the weight of the vehicle. The capsule must contain radio equipment to operate during descent and shortly after landing, must land with a low terminal velocity, and must be capable of floating; as most of the earth is covered with water. A 3 ft diameter stainless steel balloon, to be filled with gas, released at 200 miles, might land, probably at some remote location unless provided with a small rocket to interrupt its orbital course. Thermal trajectory and other characteristics are discussed and presented diagrammatically. *Subject Headings:* **1. Satellite data recovery 2. Satellite balloons 3. Satellite landings.**—*M.R.*

9.2–105 523.7:551.507.362:629.19

Spitzer, Lyman, Jr. (*Dir., Princeton Univ. Obs.*), **Astrophysical research with an artificial satellite.** *Franklin Institute, Phil., Journal of the Franklin Institute Monographs*, No. 2:69–78, June **1956. DWB**—Astrophysical uses of a satellite such as measurements in the far UV (600–3000Å) of constituents in the exosphere, the lunar atmosphere (possibly Krypton which is 22 times as heavy as He) or the atmospheres of Venus, Mars, etc.; the atomic constituents and density of interstellar space, and finally stellar atmospheres. Dr. Whipple comments on measurements from satellites with and without telescopes (large and small vehicles). Eventually the 100 or 500 pound satellites will be available for more sophisticated studies of this type. *Subject Headings:* **1. Astrophysical observation from satellites 2. Astronautics 3. Satellite observation.**—*M.R.*

GEOMAGNETISM

9.2–106 550.382

Veldkamp, J., **Waar liggen de magnetische polen.** [Where are the magnetic poles located?] *Hemel en Dampkring*, The Hague, 54(1):1–3, Jan. **1956.** 2 figs. **DWB, DLC**—The author defines the magnetic and geomagnetic poles, explains their apparently changing positions and presents maps of the northern and southern polar regions showing recorded positions of the geomagnetic poles. *Subject Heading:* **1. Geomagnetic poles.**—*I.L.D.*

9.2–107 550.384.3

Hope, E. R. (*Defence Research Board, Ottawa, Canada*), **Linear secular oscillation of the northern magnetic pole.** *Journal of Geophysical Research*, Wash., D. C., 62(1):19–27, March **1957.** 6 figs., 16 refs. **DLC**—Modern data seem to support the thesis (van Bemmelen, 1899) that the secular motion of the northern magnetic pole is a nearly linear oscillation. This oscillation is along the axis of a great magnetic anomaly in the Arctic. Except for the constraint of the anomaly, the motion would probably be circular or quasi-circular, as suggested by the historical declination-dip curves. *Subject Headings:* **1. Magnetic poles 2. Arctic.** —*Author's abstract.*

9.2–108 550.385

Tandon, J. N. (*Dept. of Physics, Univ. of Delhi*), **Focussing of solar-ion streams and formation of coronal streamers.** *Current Science*, Bangalore, 26(1):12, Jan. **1957.** 2 refs., 3 eqs. **DWB, DLC**—W. H. Bennett (1955) discussed the self focusing of solar ion streams without considering the magnetic field which remains "glued" to the stram. In the present

note, the author takes this into consideration and shows mathematically how the beam becomes focused, the critical values for the current, the reason the focusing occurs more often at sunspot minima than at maxima, and the reason the geomagnetic storms do not last so long when associated with solar M-regions as those associated with sunspot groups. *Subject Headings:* **1. Solar ion-stream focusing 2. Geomagnetic storms.**—*M.R.*

9.2–109 550.384:551.79

Griffiths, D. H. and King, R. F., **Remanent magnetism of varved clays from Sweden: the remanent magnetism of artificially deposited sediments.** [In] *Royal Astronomical Society, Monthly Notices, Geophysical Supplement*, Vol. 7, No. 3, **1956. DLC.** Resume as **Remanent magnetism of Swedish varved clays and artificial sediments.** *Nature*, London, 179(4549):27, Jan. 5, **1957. DWB**—In favorable conditions the polarization directions give at least a rough approximation to the secular variation at the time. A laboratory test is described. *Subject Heading:* **1. Paleomagnetism.**—*C.E.P.B.*

9.2–110 550.38:517.51

Zmuda, Alfred J. (*Johns Hopkins Univ.*) and McClay, John F. (*U. S. A. F. Camb. Res. Center, G.R.D., Bedford, Mass.*), **A method of interpolating magnetic data under conditions of mutual consistency.** *Journal of Geophysical Research*, Wash., D. C., 61(4):667–672, Dec. **1956.** table, 7 refs., 19 eqs. **DLC**—Because of the discreteness of the data obtained in magnetic surveys, it is necessary to interpolate between measured points before charts can be drawn. Rigorous relations connecting surface variations of different elements are herein introduced into the interpolation formulas, so that the resulting charts are mutually consistent. Related elements are continued by a power series in which the unknown coefficients are computed under the conditions of consistency. *Subject Headings:* **1. Magnetic data 2. Interpolation.**—*Authors' abstract.*

AERONAUTICAL METEOROLOGY

See also: **Condensation trails** (Appleman), 9.2–26; **Sail plane turbulence observations** (McCready et al.), 9.2–214.

9.2–111 551.509:629.135.4

Willis, A. J., **Helicopters and the forecaster.** *Meteorological Magazine*, London, 86(1024): 306–308, Oct. **1957. DWB**—Hints about flying operation—wind, temperature, visibility, cloud, icing—and briefing of pilots by forecasters. *Subject Headings:* **1. Forecasting for helicopter flights 2. Helicopter flights.**—*C.E.P.B.*

9.2–112 551.5:629.13(02)

Rossi, Biagio, **Meteorologia aeronautica.** [Aeronautical meteorology.] [Florence], Tipo-litografia Scuola di Guerra Aerea, **1952.** 200 p. 67 figs., 4 maps (fold.). **DLC** (TL556. R585)—A standard short course in meteorology for students of aviation and of meteorology intending to work in military, aviation or naval meteorological fields. The basic principles of pressure, air masses, fronts, atmosphere, thermodynamics, winds, precip., weather maps, codes, etc. are covered in a technical manner, not neglecting useful higher mathematical formulae, but not going into detail as to their derivation. *Subject Heading:* **1. Aeronautical meteorology textbooks.**—*M.R.*

9.2–113 551.551:629.13

Ribner, H. S. (*Univ. of Toronto*), **Spectral theory of buffeting and gust response: unification and extension.** *Journal of the Aeronautical Sciences*, N. Y., 23(12):1075–1088, Dec. **1956.** fig., 3 refs., 27 eqs. **DLC**—The statistical approach to the dynamic response of aircraft in turbulent air is generalized and extended. The basic element is the response of the airplane to flight through an inclined sinusoidal upwash pattern in (a) three, (b) two, or (c)—without inclination—one dimension. Case (a) is general; in case (b) the airplane is idealized as a lifting surface or a lifting line; in case (c), as a lifting point. Earlier results of Liepmann are recovered in the cases of a lifting line and a lifting point. An extension of the case of a lifting

line is made for the sweptback lifting-line, and an extension of the case of a lifting point to provide rolling moments due to spanwise upwash gradients. The general case (a) and the lifting surface in case (b) are new. *Subject Headings:* **1. Atmospheric turbulence 2. Gust effects on aircraft 3. Airplane lifting.**—*Author's abstract.*

9.2–114 551.574.7:629.13

Perkins, Porter J.; Lewis, William and Mulholland, Donald R. (*all, Lewis Flight Propulsion Lab., Cleveland*), **Statistical study of aircraft icing probabilities at the 700- and 500-millibar levels over ocean areas in the Northern Hemisphere.** *U. S. National Advisory Committee for Aeronautics, Technical Note,* No. 3984, May **1957.** 31 p. 8 figs., 5 tables, 4 refs. **DWB, DLC**—A statistical study is made of icing observations reported from weather reconnaissance aircraft flown by Air Weather Service (USAF). Wide areas of the Pacific, Atlantic, and Arctic Oceans were surveyed at fixed flight levels of 500 mb (18,000 ft) and 700 mb (10,000 ft). Icing statistics presented include the relative frequencies of the occurrence of icing, the estimated probability of flight in icing, and the relation of these probabilities to the frequencies of flight in clouds and cloud temperatures. Icing probabilities varied widely throughout the year from near zero in cold Arctic areas in winter up to 7 percent in areas where greater cloudiness and warmer temperatures prevail. *Subject Headings:* **1. Icing of aircraft probabilities 2. Aircraft weather reconnaissance 3. Northern Hemisphere.**—*Author's abstract.*

9.2–115 551.574.7:629.13

Fraser, D., **Icing experiments in flight and comparisons with wind tunnel testing.** (In North Atlantic Treaty Organization. Advisory Group for Aeronautical Research and Development, **Papers presented at the Joint Session of the Flight Test Techniques and Wind Tunnel and Model Testing Panels, Ottawa, June 1955.** pub. **1956**? p. 126–134. 6 figs.)—Icing tests in wind tunnels cannot be made with small scale models since conditions would not be analogous to those encountered in flight. Simulated icing clouds outdoors are produced in Canada with sprinklers, at the ground or behind aircraft, to get more immediate and certain (controlled) results than obtainable in nature. Tunnel tests give impression that ice formation is more extensive because of turbulence and is harder to dislodge than natural ice formations. Photos show the experimental "North Star" plane or "Ice Wagon," and several operational views of a helicopter in an ice cloud produced by a spray rig. (Natl. Aeronautical Establishment, Canada.) *Subject Headings:* **1. Icing of aircraft 2. Simulated icing conditions.** —*M.R.*

9.2–116 551.5:629.13(52) 551.551

Yonago, Japan. Weather Station, **Weathers along the air line of Itami to Miho.** *Journal of Meteorological Research,* Tokyo, 8(2):94–109, March **1956.** 33 figs., 3 tables, 3 refs. In Japanese. **DWB, DLC**—Turbulence data obtained in 19 flights between Itami and Miho from March 3 to June 17, 1955 (diagram of recording apparatus) are presented graphically along with flight cross-sections, cloud distribution diagrams and pressure charts, showing frequency distribution of turbulence in relation to the other factors. *Subject Headings:* **1. Turbulence data 2. Turbulence recorders 3. Itami-Miho air route 4. Japan.**—*G.T.*

9.2–117 551.509.34

Frost, E. S. (*comp.*), **Terminal weather at greater Pittsburgh Airport, Pittsburgh, Pennsylvania.** Kansas City, Missouri, Trans World Airlines, Inc., Meteorology Section, March **1957.** 8 p. 3 figs., ref. Mimeo. **DWB** (M09.3 T772t)—Standard terminal forecast study: surrounding terrain (incl. maps), orographic effects, seasonal and maritime effects, and empirical forecast rules; 2 charts show average annual precip. and thunderstorm regime. *Subject Headings:* **1. Local forecast studies 2. Pittsburgh Airport, Penna.**—*M.R.*

9.2–118 551.521.31:551.576:551.593:551.506.7

*Barr, Norman L.; Murray, James F.; Murray, R. D. et al., **Brightness of the atmosphere: effects of cloud conditions.** *U. S. Naval Medical Research Institute, Bethesda, Research Report,* 11:1011–1116, Oct. 20, **1953.** 67 figs. incl. photos (some fold.), 48 tables, 2 refs. **DWB**—Sky brightness data obtained at Edmonton at selected altitudes from 1000 ft to 35,400 ft for

various zenith angles (0°, 30°, 70°, 85°, 110° and 150°) on Sept. 11, 1951 (an overcast day) are thoroughly analyzed and the data presented in extensive tables, graphs and 360° photographic panoramas (for 5 altitudes from 3300′ to 11,400′). Above that level the flights were made with jet planes so photography was not practicable. It was found that under an overcast the brightest part of the sky is at the zenith, at the base of the overcast zenith is the darkest and the horizon the brightest, and the same is true above the overcast, and on clear days below the overcast. Anomalies are caused by isolated clouds, lapse rate changes (inversions have a marked effect which is reversed on clear days) pressure and humidity variations, etc. The brightness decreases very rapidly when ascending to the base of a solid overcast, whereas on a clear day it increases up to the inversion which corresponds with the cloud base. The increased brightness also corresponds with a decrease in visibility. Upper air temperature and dew point data to 70,000 ft are presented for Edmonton for 1500 Z, Sept. 11, 1951 on an adiabatic chart to show inversion level, and other features of atmospheric structure. In the last part of the report (Tables 12–48) raw data for Sept. 4, 9, and 12, 1951 at Churchill, Edmonton and Corpus Christi are presented for comparison with those on Sept. 11 at Edmonton. Some of the flights were over water, or over land and water. *Subject Headings:* **1. Sky brightness measurements 2. Cloud effects on sky brightness 3. Edmonton, Canada. I. Hussman, T. A., Jr. II. Parker, J. F.**—*M.R.*

9.2–119 551.508.82:551.576.1

Newton, Kenneth E., **Instrumentation of B-17 airplane for cloud physics research.** Chicago. Univ. Dept. of Meteorology, Contracts AF 33(038)-25913, AF 19(604)-618 and AF 19(604)-1388, Technical Note No. 4, Nov. 15, **1955.** 77 p. 67 figs. (incl. photos), 17 refs. **DWB**—A detailed description is given of the entire instrumentation system employed for cloud physics measurements using B-17 airplanes. Among the physical variables measured were the following: air temperature, dew-point temperature, cloud-droplet sizes and concentration, liquid-water content, electric-field strength, altitude variations of the airplane and precipitation. Systems for time synchronization and data recording are also described. Wiring diagrams of the electronic circuits and photographs of all instruments are given. The airplanes carrying this equipment were used for two years in various parts of the country for making measurements in cumulus clouds. Operational difficulties experienced with some instruments under field conditions are mentioned and remedial measures are discussed. *Subject Headings:* **1. Air-borne instruments 2. Cloud physics research. I. Chicago. Univ. Dept. of Meteorology.**—*Author's abstract.*

GLACIER ICE AND SEA ICE

See: **Sea ice forecasting** (McGough), 9.2–52; **Glacier retreat, Baffin Island** (Thompson), 9.2–54; **Glacier-met. observations, Baltoro Region** (Flohn), 9.2–146; **Glacier variations, Europe** (Bockler), 9.2–250; **Glacial periods** (Simpson), 9.2–254; **Climatic conditions of Akchaghl** (Vostriakov et al.), 9.2–255.

AGRICULTURAL METEOROLOGY

See also: **Agrometeorology conferences,** 9.2–2; **Arid zone research, Mexico,** 9.2–4; **Influence of climate upon agricultural production** (Gol'tsberg, Drozdov), 9.2–22; **Agrometeorology atlas for Japan** (Daigo), 9.2–39.

9.2–120 551.506:551.524.37(776)

*State-Federal Crop and Livestock Reporting Service, St. Paul, Minnesota, **Minnesota agricultural statistics, 1953/1954.** pub. June **1955.** 69 p. 10 figs., 69 tables. **DWB**—Contains a table giving frost dates or the number of years in fifty that frost is likely to occur in various sections of the state before and after a given date. Maps with isolines showing average number of days without killing frost and average warm-season precipitation and a climatic summary giving normal temperatures, normal precipitation for selected stations in Minnesota. *Subject Headings:* **1. Frost data 2. Climatic summaries 3. Minnesota.**—*I.L.D.*

9.2–121 551.509.5:63:061.1(43)

Brandtner, E.; Schneider, M.; Uhlig, S. and Witterstein, F., **Tätigkeitsbericht der Abteilung Agrarmeteorologie in der Zentralstelle des Deutschen Wetterdienstes.** [Activity report of the Agro-Meteorology Section of the Central Institute of the German Weather Service.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 2(14):7–23, **1955.** 7 figs. **DWB**—The organization of the agricultural meteorology section of the German Weather Service Central is outlined and the practical and theoretical work of each subsection is described. The fields of activity include the following: general professional problems and work methods, rural climatology, soil and stand climatology, agro-meteorological participation in agricultural planning, in damage prevention and aid in forecasting and warning service, phenology and agro-meteorological reports. This report contains maps showing relative distribution of wind velocity in per cent at the principal stations (Grosswenkheim, Bad-Kissingen), wind protection planning at Grosswenkheim and the extent of phenological descriptions for various districts in West Germany and graphs showing the frequency of critical weather periods during the interval 1938–1951 in Bavaria, the variation of phytophtera development in Kiel and Bonn and of critical weather conditions, etc. *Subject Headings:* **1. Agrometeorological services 2. Agrometeorological forecasting 3. German Meteorological Service.**—*I.L.D.*

9.2–122 551.579.5

Druzhinin, D. V., **Ob oshibkakh i agrometeorologicheskikh biulleteniakh Kemerovskogo gidrometeorologicheskogo biuro.** [Errors in agrometeorological bulletins of the Kemerov Hydrometeorological Office.] *Meteorologiia i Gidrologiia*, Leningrad, No. 2:57, Feb. **1956. DWB, DLC**—The data on productive moisture reserves of the soil 0–50 and 0–100 cm published in several bulletins were found to be 2–3 times the actual values. *Subject Headings:* **1.Soil moisture errors 2. U.S.S.R.**—*I.L.D.*

9.2–123 551.577.38:551.573

*Holcombe, J. L. and Wiegmann, Fred H. (*both, Dept. of Agri. Economics*), **Drought intensity and irrigation needs for cotton in the St. Joseph area.** *Louisiana. Agricultural Experiment Station, Baton Rouge, Dept. of Agricultural Economics, Circular*, No. 185, Dec. **1955.** 47 p. figs., tables, foot-refs., 15 refs. in bibliog. **DWB** (M77.38 H725d)—In order to obtain an accurate estimate of the economic advantage or disadvantage of supplemental irrigation over a period of years, a rational method of estimating drought hazard is required. Not only precip. but temp., humidity and hours of daylight, and agronomic factors must be considered. THORNTHWAITE's method of estimating daily evapotranspiration was used for analyzing records for St. Joseph, La. for period April 15–Aug. 14 for the years 1914–1954 (41 years). The general method of estimating drought hazard was that of VAN BAVEL (1952–3, *see* 5.6–198, June 1954 and 6.1–279, Jan. 1955, *MAB*) and separate estimates were made for Mhoon and for Commerce loams. Data are presented in several (i.e., (1) drought days, (2) number of irrigations and (3) rainfall deficiency) ways in tables and graphs and are discussed in text. *Subject Headings:* **1. Drought intensity 2. Irrigation 3. Evapotranspiration estimates 4. Cotton 5. St. Joseph, La.**—*M.R.*

9.2–124 551.506.8:634

*Liatkovskiĭ, A. K., **Prokhozhdenie fenofaz mandarina "Unshiu" v usloviakh zapadnoĭ Gruzii v zavisimosti ot meteorologicheskikh faktorov.** [Development of various phenological phases of the "Unshiu" tangerine in Western Georgia depending on meteorological factors.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, 37(64):13–19, **1954.** 7 tables. **DLC**—The results of a ten-year study on the dependence of the development and growth of the "Unshiu" tangerine upon weather in the eastern region of the Georgian SSR. Winter conditions of this tangerine are reflected in the vegetative period and influence the onset of the principle phenological stages. A disturbance of the sequence of the onset of the phenological phases (unfolding of leaves and bud formations) results from low temperatures during the period of winter dormancy and during early spring. Almost every year citrus fruits are subject to various degrees of injury from frost, mechanical action of strong winds, snow deposits, etc. in various localities in subtropical regions. Spring and summer drought retards the ovary formations and hence a reduced crop. The importance of antecedent weather conditions in

forecasting developmental phases is stressed. Numerical data on phenological dates and the relationships between weather conditions and developmental stages are presented in tables. *Subject Headings:* **1. Phenological observations 2. Citrus fruits 3. Georgia, SSR.**—*I.L.D.*

9.2–125 551.586:63

†*Hustich, Ilmari, **Yields of cereals in Finland and the recent climatic fluctuation.** *Fennia*, Helsinki, 73(3), **1950.** 32 p. 8 figs., 15 tables, 27 refs. **DLC** (G23.G4)—A monographic study of the yields of cereals (oats, rye, barley and wheat) from 1861–1948, in relation to climatic factors (temp., precip., etc.) and other factors (length of day, economic conditions, war, geographical isolation, etc.). Comparison is made with similar data for Sweden, Denmark and the Mississippi Valley. The long period trend, showing increased production up to 1939 and a slight downward trend after 1939, corresponds to the temperature trend. Variability in production increases rapidly to the north, partly due to fewer farms and partly to greater variability in climate, just as corn production varies more toward the dry west (Great Plains). *Subject Headings:* **1. Climate-crop yield correlations 2. Cereal cultivation 3. Finland.**—*M.R.*

9.2–126 551.586:633.11:632.111.3 551.582.2(47)

*Okushko, A. A., **Agrometeorologicheskaia kharateristika uslovii perezimovki ozimykh kul'tur na territorii orosheniia Kuĭbyshevskogo gidrouzla.** [Agrometeorological characteristics of winter wheat culture in the irrigated region of Kuibyshev Hydrometeorological Network.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, 29(56):77–92, **1953.** 5 figs., 14 tables, 4 refs. **DLC**—With the aid of numerical and graphical data, the author discusses the climate of the Middle Volga region. The paper includes the following: a brief summary of the climatic conditions of the winter season, meteorological conditions of the winter season and their effect on winter crops, and condition of the winter crop during the fall and winter-spring periods. *Subject Headings:* **1. Climate of Middle Volga region 2. Winter wheat cultivation 3. Climatic effects 4. Volga Region, U.S.S.R.**—*I.L.D.*

FOREST METEOROLOGY

9.2–127 551.556.2

Smal'ko, Ia. A., **Zony vetrozashchitnogo vliianiia lesnykh polos raznykh konstruktsiĭ.** [Zones of wind protection provided by forest strips of different structures.] *Akademia Nauk SSSR, Izvetiia, Ser. Geog.*, No. 5:44–47, Sept./Oct. **1955.** 3 figs. **DLC**—The results of investigations on wind protection provided by dense (wind fast) forest strips, and by open forest strips are analyzed and presented by means of graphs. *Subject Headings:* **1. Wind protection 2. Forest shelter belts.**—*I.L.D.*

9.2–128 551.510.42:546.22:634.9

Abramashvili, G. G., **Vliianie zagriazneniĭ atmosfernogo vozdukha na khvoĭnye nasazhdeniia.** [Effects of atmospheric pollutants on conifers.] *Gigiena i Sanitariia*, Moscow, 22(4):67–69, April **1957.** table. **DLC**—The author briefly reviews various studies on the effect of atmospheric pollutants upon conifers with special reference to the fir tree *P. pungens* Eng., the absorption capacity of various atmospheric impurities such as sulfur compounds absorbed by conifers, the resistance of fir trees to air pollution under urban conditions, etc. This is followed by presentation and discussion of studies carried out in Moscow on the sulfur contained in and upon the needles and the condition of *P. pungens* Eng. during various conditions of growth in Moscow. It is shown that the needles of this tree have a high capacity for absorbing sulfur containing pollutants from the atmosphere and of retaining them. Conifers help in purifying the air in cities. *Subject Headings:* **1. Atmospheric pollution effects on conifers 2. Sulphur absorption by conifers.**—*I.L.D.*

9.2–129 551.584.41:535.241:634.94

†*Shirley, Hardy L., **Reproduction of upland conifers in the Lake States as affected by root competition and light.** *American Midland Naturalist*, Notre Dame, Indiana, 33(3):537–612, May **1945.** 20 figs., 31 tables, 57 refs. **DLC**—On p. 539–540 a discussion of the climate of Cass Lake, Minn., lat. 48° (1930–36) and on p. 541–543 the cloudiness and light intensity

(at 24 stations at height of 4′) are discussed with respect to growth of conifer seedlings in nursery beds. Light intensity, evaporation, temperature (air and soil) and soil moisture in aspen forests are discussed (on p. 558–560) with data tables interspersed. Temperature variations in jack pine plots, and other weather factors are treated on basis of 5 years of record on p. 576–579. Emphasis is on effect of shade or light on reproduction. *Subject Headings:* **1. Light intensities in forests 2. Forest microclimates 3. Forest nurseries 4. Cass Lake, Minn.**—*M.R.*

INDUSTRIAL METEOROLOGY

See also: **Atlas for air conditioning engineers,** 9.2–38; **Cargo protection** (Shellard), 9.2–83.

9.2–130 621.56/7:551.521.1

Trombe, Félix and Foëx, Marc, **Sur la production de froid à l'aide du rayonnement solaire.** [Production of cold by means of solar radiation.] *Académie des Sciences, Paris, Comptes Rendus*, 242(8):1000–1003, Feb. 20, **1956.** fig., 2 refs. **DLC.** Trans. into English in *Journal of Solar Energy Science and Engineering*, Phoenix, Ariz., 1(1):51–52, Jan. **1957.** fig. **DWB, DLC**—Details of construction are given for a solar refrigerating apparatus developed at the Montlouis Laboratory. The refrigerator functions by means of an intermittent ammonia cycle in which the ammonia solution is directly heated by solar radiation. In prototype trials, daily production of ice was about 6 kgm. *Subject Heading:* **1. Solar refrigerators.**—*Authors' abstract.*

9.2–131 551.515:622:665.5(26)

Malone, Thomas F. (*Dir., Weather Res. Center, Hartford, Conn.*), **Weather hazards in offshore operations.** *World Oil*, Houston, Texas, 142(7):176–184, June **1956.** figs., photo. **DLC**—Lack of adequate weather reports in Gulf of Mexico adds to natural difficulty in forecasting tropical squalls and even line squalls or hurricanes for off shore drilling operations. Problems encountered in present service and recommendations for improvement of service include: 1) regular reports from off shore rigs 4 times a day, 2) one or more weather radar sets at places where offshore operations are intense, 3) 24-hour professional meteorological service, 4) network of automatic weather stations at rigs not now reporting, 5) direct consultation between operators and meteorologists giving out advice. *Subject Headings:* **1. Offshore oil industry 2. Offshore drilling protection 3. Industrial meteorology 4. Hurricane advisories 5. Gulf Coast, U. S.**—*M.R.*

9.2–132 551.5:368

Malone, Thomas F., **Weather and insurance.** *Oceanus*, Woods Hole, Mass., 4(3):13–15, Spring **1956.** 2 photos. **DWB, DLC**—A popular summary of the basis on which insurance companies calculate the risk factor in wind or hailstorms. Although based on climatic records of the past, knowledge of climatic trends would prove valuable. *Subject Headings:* **1. Insurance meteorology 2. Climatic trends.**—*M.R.*

9.2–133 551.521.1:621.47

Farber, Erich A.; Bussell, W. H. and Bennett, J. D. (*all, Univ. of Florida, Gainesville*), **Solar energy used to supply service hot water.** *Air Conditioning, Heating and Ventilating*, N. Y., 54(10):75–79, Oct. **1957.** 7 figs., table, ports. **DLC**—Data obtained from actual experience, on design of solar water heating systems, are presented. Charts show amount of solar energy available in different regions of the U. S. in March, June, Sept. and Dec., based on 20 year averages. Data are given in Ly's/day for flat horizontal surface. Conversion factors for the 4 seasons for reducing above data to apply to energy falling on a surface facing south and inclined 10° more than the local geographic latitude, for 0–55°N are given in a nomogram. Economic aspects are worked out for various modifications of the system. *Subject Headings:* **1. Solar water heaters 2. Solar energy available for heating 3. U. S.**—*M.R.*

9.2–134 551.5:65

Wright, A. J., **Weather and the department store.** *Weather*, 7(12):380, Dec. **1952. DWB**—Brief account of effect of weather on sales. *Subject Heading:* **1. Applied meteorology.** —*C.E.P.B.*

9.2–135 551.586:628.8 697

*Taksony, György, **Városok-településekfűtési és egyéb hőigénye.** [Heat requirements of cities and settled areas for heating and other purposes, Pt. 1.] *Magyar Energiagazdaság*, Budapest, 8(5):176–185, May **1955. Pt. 2,** *Ibid.*, 8(7):266–274, July **1955. Pt. 3,** *Ibid.*, 8(8):308–313, Aug. **1955.** 28 figs., 12 tables, 24 refs., eqs. **DLC**—For use in the planning of central heating plants, the author presents detailed calculations and data concerning the heat requirements of buildings. The first two parts of the paper deal with heating requirements. Among the meteorological factors, ambient temperature, wind, and radiation amount are considered (tables of average monthly values for various stations in Hungary are included). In Pt. 3 heat requirements of ventilation, warm-water supply and industrial operations are discussed. The study is based on work done in Germany and the U.S.S.R., and the author's own research. *Subject Headings:* **1. Heat requirements of buildings 2. Heating and ventilating.**—*G.T.*

9.2–136 551.581:535.8:620.19

British Scientific Instrument Research Association, **Optical glass in the tropics.** Its *SIRA Technical News*, Chislehurst, No. 38:26–28, April **1956.** fig. **GB-MO**—High humidity in the tropics can damage polished glass surfaces in optical instruments by absorption of water and growth of fungus. Samples of glass were exposed in jungle at Port Harcourt, Nigeria, for a year but little effect was found. *Subject Headings:* **1. Tropical climate effects 2. Hot humid climate effects.**—*C.E.P.B.*

9.2–137 551.556.3

Kakas, József and Mezősi, Miklós, **Szélviszonyaink vizsgálata és az országos energiagazdálkodás.** [Investigation of wind conditions in Hungary, and the national power industry.] *Időjárás*, Budapest, 60(6):350–364, Nov./Dec. **1956.** 5 figs., 6 tables, 9 refs. French summary p. 350. **DLC**—Possibilities of wind energy utilization in Hungary are limited but in view of the scarcity of other sources of energy it is desirable to make a survey of the amount of wind energy available in that country. In this paper the studies made in Hungary on the subject are reviewed. Data obtained in 1955 by means of five anemographs in the Budapest region are analyzed with special attention to the parameters significant from the point of view of energy utilization (frequency distribution of wind velocities, annual variation of available energy, frequency of unusable wind speeds, distribution of wind speed with height, local differences, etc.). It is found that the amount of wind energy available warrants further research into Hungary's wind energy resources. The establishment of a nation-wide network of 26 stations is proposed for such research and their suggested locations (and those of stations already existing) are shown in a map. *Subject Headings:* **1. Wind utilization 2. Hungary.** —*G.T.*

9.2–138 551.556.3:621.311.24

Golding, E. W. (*Rural Electrification and Windpower Dept., Electrical Research Assoc., London*), **Utilization of wind power in desert areas.** (In: International Symposium on Desert Research, Jerusalem, May 7–14, 1952, **Proceedings,** p. 592–604, pub. **1953.** 4 figs., 2 tables, 7 refs. Discussion p. 603–604.) **DWB**—The author discusses the general aspects of the availability of power from wind energy such as in wind velocity and duration, the calculation of power derived from wind energy and the annual energy available; the economics of wind power generation; the utilization of wind power in water heating, refrigeration, water pumping, etc.; and the planning and execution of wind surveys in a semiarid region such as Israel. *Subject Headings:* **1. Wind utilization 2. Wind power 3. Wind energy 4. Semiarid regions 5. Israel.**—*I,L,D.*

9.2–139 551.521.2:660.048

Solar distillation of saline water. *Science*, Wash., D. C., 124(3235):1287, Dec. 28, **1956. DLC**—Cheaper, more durable or more efficient salt water distilleries are suggested by the U. S. Dept. of Interior's Office of Saline Water, based on experience since 1953 of David S. Jenkins and Maria Telkes, using earlier patents of Defoe Ginnings of the Bureau of Standards. One method is to use the heat of condensation to supplement the heat from the sun used in evaporation, another method due to George O. G. Lof of Denver is to have roof type stills built directly on the ground, allowing heat stored in earth during day to be used at night and eliminating insulation. *Subject Headings:* **1. Salt water distillation 2. Solar stills.**—*M.R.*

9.2–140 697

Griffith, Miriam V., **Some aspects of heat pump operation in Great Britain with particular reference to the Shinfield installation.** *Institution of Electrical Engineers, Proceedings, Pt. A*, 104(15):262–278, June **1957.** 6 figs., 4 tables. **DLC**—Heat-pump operation in Great Britain is reviewed from the point of view of the electricity supply industry. The factors which have to be taken into consideration for possible applications are discussed, e.g., sources of low-grade heat, capacity required and special methods of utilization. British experience, including the results of laboratory investigations on heat transfer from the soil and other aspects, is described. Details of construction and operation of a practical 10 h.p. heat pump, installed to warm a laboratory building, and using the earth as its source of low-grade heat, are given. Observations of performance include load factor and maintenance and attendance. The economic aspect is dependent on the present state of development, but future improvements together with comparisons with other methods of performing the same duties are considered. The paper concludes with a discussion of the value of the heat pump as an electrical load. *Subject Headings:* **1. Heat pumps 2. Great Britain.**—*Author's abstract.*

MEDICAL METEOROLOGY

9.2–141 551.594.12:616.23

†Kornblueh, Igho H. and Griffin, James E., **Die künstliche Ionisation der Luft in der physikalischen Medizin (Vorläufiger Bericht).** [Artificial ionization of the air in physical medicine: preliminary report.] *Wetter und Leben*, Vienna, 8(3/4):57–64, **1956.** fig., 5 tables, 38 refs. **DLC**—The author discusses natural and artificial ionization, describes the commercially available devices for ionizing air and summarizes some of the literature dealing with the negative ionization of oxygen, nitrogen cells, pollen, etc., and then reports on experiments in which 27 individuals suffering from asthma were exposed to ionized air. It is shown that allergic conditions respond favorably to air artificially ionized negatively. *Subject Headings:* **1. Artificial ionization 2. Medical meteorology 3. Asthma.**—*I.L.D.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Method of evaporation calculation** (Bernard), 9.2–28; **Standard atmosphere** (U.S.N.A.C.A.), 9.2–37; **Ben Nevis Observatory** (Reynolds, Champion), 9.2–62; **Kiruna Geophysical Observatory** (Hultqvist), 9.2–63; **Photometers for measuring airborne salt** (Woodcock and Spencer), 9.2–169; **Precipitation measurement** (Brooks), 9.2–232.

9.2–142 551.501.7:551.557:551.507.362

Anderson, Albert D., [**Comments on**] **H. J. aufm Kampe: Upper-air wind measurements with small rockets** (*see* 8.5–149, May 1957, *MAB*). *Journal of Meteorology*, 14(5):473–474, Oct. **1957.** 6 refs. **DWB**—The proposal of H. aufm Kampe (*J. Meteor.* 13(6):601–602) to use rockets to carry chaff to 120,000 ft where it can be followed by radar to give upper winds is regarded as unduly optimistic but the Navy system is available. Aufm Kampe regards Anderson's proposal to use a silver coated balloon as very good. *Subject Headings:* **1. Upper air wind measurements 2. Rockets.**—*C.E.P.B.*

9.2–143 551.501.7:551.557.36:551.547.3:519.2:551.515

Thompson, P. D., [Comments on] **A. F. Jenkinson: The relation between standard deviation of contour heights and standard vector deviation of wind.** *Royal Meteorological Society, Quarterly Journal*, 83(358):553–554, Oct. **1957.** eq. **DWB**—Thompson comments on Jenkinson's paper (*Ibid.*, 82(352):198–208, April **1956,** *see* 7.9–74, Sept. 1956, *MAB*), that his k is a horizontal scale of deviations from average conditions, which is constant from 850–300 mb at 0.0635 kt/ft, corresponding to a wave-length of 2400 mi. Jenkinson replies that migratory pressure systems do possess considerable vertical coherency as shown in the Mediterranean region. *Subject Heading:* **1. Upper air wind variability.**—*C.E.P.B.*

9.2–144 551.501.81:551.577

Boucher, Roland J., **Synoptic-physical implications of 1.25 cm vertical beam radar echoes.** Blue Hill Meteorological Observatory, Contract AF 19(604)-950, Meteorological Radar Studies, No. 5, May 31, **1957.** 24 p. 13 figs., 11 refs. **DWB**—More than 1000 hrs of radar records taken with the APS-34 1.25 cm vertical beam radar during a four-year period have been readily classified into four clearly recognizable types. A limited number of precipitation growth mechanisms are thereby suggested and the echo types representing them are shown to be well correlated to three basically different classes of synoptic situations. A generalized echo cyclone model is derived. Maximum attainable hourly rates of precipitation are empirically related to the depth of detectable echo. Evidence is found of a slight correlation existing between the height of the warm front surface and that of the top of the radar echo above, with an average vertical distance between them of 12,000 ft. A marked increase in the frequency of precipitation echoes is found in the temperature interval −11 to −15C. *Subject Headings:* **1. Radar precipitation echoes 2. Radar analysis of precipitation.**—*Author's abstract.*

9.2–145 551.501.81:551.577

Illinois State Water Survey. Meteorologic Laboratory at the Univ. of Illinois, **Study on intensity of surface precipitation using radar instrumentation.** Contract DA-36-039 SC-64723, First Quarterly Technical Report, July 1–Sept. 30, **1955.** 24 p. 2 figs., 6 tables, 2 refs., 2 eqs. **DWB**—Routine operation of the CPS-9 was maintained throughout the period. Difficulties with the camera installation have been overcome and the TPS-10 is now on a routine operational status. Operational testing of the area integrator has not progressed due to circuit design difficulties. Analysis of data relevant to development of an empirical relation between back-scattering cross-section, σ, and rainfall rate, R, is nearing completion. The study of the electrical properties of non-spherical drops was completed and the results summarized in Illinois Water Survey Report of Investigation No. 28. Results are presented for the point precipitation detection study with the CPS-9, which was started in fall 1954 and recently completed. Preliminary results of an areal precipitation detection study to determine the capability of the CPS-9 in detecting hourly rainfall occurrences on an areal basis are given. Results of the two detection studies to date indicate that the CPS-9 is an excellent detector of light rainfall to ranges of 75 mi and of moderate to heavy rainfall to ranges of 150 miles. For snow, the detection capability appears to drop off rapidly beyond 50 mi. Results of a study to determine the feasibility of using PPI data to correct radar-indicated point and areal rainfall rates for precipitation attenuation are discussed. The results indicate that either the method of attenuation compensation used in the study is inadequate or that other large sources of variance are present which mask the influence of attenuation correction on reducing the variance among radar-rainfall estimates. Because of continued difficulties in obtaining accurate radar-rainfall estimates, a further study was made of the effects of correcting for precipitation attenuation by using rain gage data from the concentrated Goose Creek Network. The study was made on both a point and areal basis. Results indicate that precipitation attenuation correction does not significantly affect the variance among radar-rainfall estimates. *Subject Headings:* **1. Radar rainfall intensity studies 2. Radar analysis of rain 3. Areal precipitation. I. Stout, G. E.**—*Author's abstract.*

OBSERVATIONAL DATA

See also: **Phenological data, E. Germany** (Seyfert), 9.2–33; **Oceanog. data, Heard Is.** (Ealey, Chittelborough), 9.2–87; **Frost data, Minnesota,** 9.2–120; **Phenological obs.** (Liatkovskiĭ), 9.2–124.

9.2–146 551.506.5:551.311.12

*Flohn, Hermann, **Zur Meteorologie des Baltoro-Gebiets.** [Meteorology of the Baltoro Region.] **1955**? 9 p. 6 tables. Privately printed. **DWB**—This study of the meteorology of the Baltoro Glacier is based upon observations made by A. Bitterling (Oct.–Nov. 1955) at various camps supplemented by an analysis of daily 500 mb charts constructed on the basis of Central Arctic (Soviet), Indian and Pakistan data. The analysis includes an account of the large scale weather situation during the period of ascent and a discussion of the characteristics of the climatic variables of temperature, relative humidity, cloudiness, atmospheric pressure (meteorological data given in tables in the appendix). The seasonal conditions suitable for most favorable ascents are considered. *Subject Headings:* **1. Glacier-meteorological observations 2. Large scale weather processes 3. Baltoro Glacier.**—*I.L.D.*

9.2–147 551.506.7(669)

*East Africa High Commission. Meteorological Dept., **Summary of upper winds as measured by radar methods at Nairobi, Jan. 1948/Feb. 1950.** 3 p. entirely tables. Also: . . . **during 1950.** 3 p. entirely tables. **DWB**—Radar winds obtained at Nairobi for each month are tabulated to 8 directions and 3 velocity groups for each month and for each level (700, 600, 500, 400, 300, 200 and 100 mb) for Jan. 1948 to Dec. 1950. *Subject Headings:* **1. Upper air wind data 2. Nairobi, Kenya.**—*M.R.*

9.2–148 551.506.7:551.557(931)

*Farkas, Edith, **Upper winds over Canton Island and Tarawa.** *New Zealand. Meteorological Service, Technical Note,* No. 115, Sept. 8, **1954.** 7 p. 5 figs., 2 tables. **DWB**—Upper winds over Canton Island and Tarawa have been analyzed for a period of one year and six months, respectively. Monthly mean wind vectors and standard vector deviations at standard levels are given for both stations. *Subject Headings:* **1. Upper air wind data 2. Canton Island 3. Tarawa, New Zealand.**—*Author's abstract.*

9.2–149 551.506.7:551.557(51)

*Hong Kong. Royal Observatory, **Upper winds of Hong Kong, from observations made with pilot balloons, 1921–1932.** Hong Kong, Noronha, **1933.** 13 p. 2 tables, 9 plates. **DLC**—Results of 1382 pilot balloon runs made at Hong Kong from 1921–1932 are tabulated and analyzed. Wind roses are given for each 1000 ft level from 1000 to 10,000 ft and 2000 ft level to 30,000 ft, for each month. Monthly resultant direction and mean velocity, winds up to 40,000 ft in vicinity of typhoons, and % frequency from different directions for various synoptic types (illustrated by synoptic charts of Far East for each type) are given in tables and graphs. *Subject Headings:* **1. Upper air wind data 2. Upper air wind roses 3. Synoptic types 4. Upper air winds near typhoons 5. Hong Kong. I. Heywood, Graham S. P.**—*M.R.*

9.2–150 551.506.7(512.317):551.557

*Hong Kong. Royal Observatory, **Meteorological results, 1951, Pt. 2, Upper air observations.** Issued Hong Kong, **1954.** 78 p. Almost entirely tables. Also **1953 and 1954, Pt. 2,** both issued **1955.** About 90 p. each. **DWB**—1953 report consists of 3 parts: 1) wind direction and speed at heights of 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 18 and 20 thousand ft from pilot balloon ascents at 05, 11, 17 and 23 h, for each day of 1953, at the Royal Observatory; 2) pilot balloon ascents at 00, 06 and 09h to 40,000 ft from the ship *Hin Sand* during its voyages from Hong Kong to Borneo June 3 to Oct. 1, and Nov. 4 to Dec. 25, 1953; and 3) radiosonde and upper air wind observations at 08 or 09h local time from Kings Park Radio Stations, ½ mi N of the observatory. Kew Mark II radiosondes were used before June 1, 1953, and Kew Mark IIb after. Table 5 gives rawin ascents Oct.–Dec., 1954, including surface, 1000, 900, 850, 800, 700, 600, 500, 400, 300, 200, 150, 100, 60 and 40 mb data for each observation. Also highest freezing level, tropopause pressure, geopotential and temperature, maximum wind shear-

vector change and temperature inversions. (For abstract on 1952, Pt. 2, *see* 7.4–98, April 1956, *MAB*.) *Subject Headings:* **1. Upper air data 2. Radiosonde data 3. Inversion data 4. Ship pibal data 5. Hong Kong.**—*M.R.*

9.2–151 551.506.7:551.508.822(518)

*Japan. Central Meteorological Observatory, Tokyo, **Aerological data of Dairen (radiosonde), Sept. 1944–March 1945.** Pub. July **1950.** 18 p. Entirely tables. **DWB**—Data on free-air pressure (mm), temperature (°C) and humidity (%) for levels from surface to 14 km are presented in tables for each day from Sept. 1, 1944 to March 31, 1945, and the means for each level for each month. At least half of the days each month and in some cases as many as 28 days are available for the first 5 or 6 km. *Subject Headings:* **1. Radiosonde data 2. Observational data 3. Upper air data 4. Dairen, Manchuria.**—*M.R.*

9.2–152 551.506.7:551.594.11

Venkiteshwaran, S. P.; Gupta, B. K. and Huddar, B. B. (*Met. Office, Poona*), **Measurement of the electrical potential gradient in the atmosphere by radiosonde.** *Indian Journal of Meteorology and Geophysics*, Delhi, 5(3):253–256, July **1954.** 2 figs., 2 refs. **DWB, DLC**—Using the HL-23 valve-electrometer of Koenigsfeld and Piraux (1951) (*see* 6.5–62, May 1955, *MAB*) adapted to the U. S. Signal Corps radiosonde, with polonium or lead nitrate collectors (*see* 1953 articles by authors, 5.1–307 and 5.8–275), improvements were made by (a) using wire with low temperature coefficient of resistance for load resistance to prevent changes in resistance due to temperature changes aloft, (b) providing steady potential source of 6 v between grid and cathode, (c) eliminating load resistance, (d) maintaining filament voltage of 1.5 v to reduce cathode glow emission. Above changes double the audio-frequency range for measuring potential gradient and reduce weight of load by 200 g. The HL-23 tube replaces the temperature and humidity elements. A beautiful record up to 22 km made on 4/3/'53 at 1718 h local time shows minor variations up to 11.2 km above which the gradient rose rapidly to >150 v/m (beyond edge of paper which read 115 v/m at 14 km) then back to 8 v/m at 17.5 km. Changes are explained on basis of clouds. Maximum at 14 km was definitely above top of anvil cloud which was present though no thunder or lightning were observed at Poona. Finally, several ingenious methods of making the polonium collectors or lead nitrate fuses are discussed. *Subject Headings:* **1. Radiosonde electrical conductivity soundings 2. Potential gradient measurement 3. Polonium collectors 4. Poona, India.**—*M.R.*

9.2–153 551.506.7:551.507.362

†Whipple, Fred L. (*Harvard Col. Obs.*), **Density, pressure and temperature data above 30 kilometers.** (In: Kuiper, Gerard P., ed., **The earth as a planet.** Chicago. Univ. of Chicago Press, **1954.** p. 491–513. 7 figs., 3 tables, 19 refs.) **DLC** (QB501.K75)—A complete summary of results of recent observations of upper atmosphere pressure, density and temperature, as obtained from rocket firings. Earlier work is not reviewed. Diurnal, seasonal and latitudinal variations are discussed, and the chief results tabulated by 2, 5 or 10 km levels up to 219 km, and shown on graphs (to 160 km). Meteor and sound propagation data are also considered briefly. *Subject Headings:* **1. Upper air data 2. Rocket observation data.**—*M.R.*

INSTRUMENT CARRIERS

See also: **Satellite instrumentation** (Singer), 9.2–96; **Satellite orbits** (Davis et al.), 9.2–97; **Satellite geomag. obs.** (Heppner), 9.2–98; **Radio tracking of satellites,** 9.2–99; **Satellites,** 9.2–100; **Satellite tracking** (Hudson), 9.2–101; **Satellite air density measurement** (Jones, Bartman), 9.2–102; **Satellite cosmic ray recorders** (Ludwig, Van Allen), 9.2–103; **Satellite data recovery** (Porter), 9.2–104; **Satellite astrophysical obs.** (Spitzer), 9.2–105; **Rocket measurement of upper air winds** (Anderson), 9.2–142; **Rocket observation data** (Whipple), 9.2–153; **Rocket grenade experiments,** 9.2–183.

9.2–154 598.2:591.17:551.507.2(26)

McLean, Ivor and Williamson, Kenneth, **Migrants at North Atlantic Weather Ships in 1956.** *Marine Observer*, 27(177):152–156, July **1957.** 5 figs., 13 refs. **DLC**—Passage migra-

tion through British Isles is largely due to unfavorable weather. Migrants landed on Weather Ships mostly in anticyclonic weather with thick cloud preventing sun-fixes. Some landing on "J" came from western France or south-west British Isles and were not unduly fatigued, others from Iceland or Greenland were exhausted. *Subject Headings:* **1. Bird migrations 2. Weather ships.**—*C.E.P.B.*

9.2–155 551.507.2:551.508.824

Meteorological buoy. *Science*, 123(3200):717, April 27, **1956. DWB, DLC**—A robot marine weather station which can be anchored like a buoy and left unattended for 6 months, has a radio range of 800 miles and is 20 feet long, 10 ft wide and has a draft of about 3 ft It is nonmagnetic and made mostly of aluminum, has 2 masts and can be anchored in water up to 3600 ft deep. It was designed by the U. S. National Bureau of Standards. *Subject Headings:* **1. Automatic weather stations 2. Buoy weather stations 3. Marine meteorological observations. I. U. S. National Bureau of Standards.**—*M.R.*

9.2–156 551.507.2:551.508.824

U. S. National Bureau of Standards, **An ocean-based automatic weather station.** *Franklin Institute, Phil., Journal*, 261(6):654–656, June **1956. DLC**—A detailed description of the structure and mode of operation of a prototype marine weather station, that automatically reports local weather data developed at the National Bureau of Standards (U. S.) by P. D. Lowell, W. Hakkarinen and L. M. Allison. The range of the station, the range of the weather elements recorded, the transmission of the observations recorded by the weather sensing elements and the vessel carrying the station are discussed. *Subject Headings:* **1. Ocean weather stations 2. Weather ships 3. Automatic weather stations.**—*I.L.D.*

9.2–157 551.507.321.2

Leonov, IU. T., **Uluchshenie ventiliatsii sharopilotnykh fonarikov.** [Improving the ventilation of pilot balloon lanterns.] *Meteorologiia i Gidrologiia*, No. 6:39–40, June **1956. DWB, DLC**—In order to prevent the extinction of the lights in the pilot balloon used by the meteorological service of the Kirgiz SSR, the ventilation of the lantern, which has an upper and lower opening, has been modified. The openings are covered with paper and the lateral and upper sides of the lantern (some 200 to 300 openings) are punctured with a sharp pencil point. Enough air is thus provided for the normal burning of the lamp. *Subject Heading:* **1. Pilot balloon lantern ventilation.**—*I.L.D.*

9.2–158 551.507.321.2:551.551

Longley, Richmond W., **The rate of ascent of pilot balloons and the variation of wind velocity as determined by them.** *Suffield Experimental Station, Ralston, Canada. Suffield Technical Paper*, No. 96, May 30, **1956.** 8 p. 5 tables, 5 refs. At head of cover-title: Defence Research Board, Dept. of National Defence, Canada.—Four series (70) of 2-theodolite pilot balloon ascents were made in March, April, June and July, 1955 at Suffield Exp. Sta., Ralston, Alberta (2500 ft elev.). The readings were made every ½ min, and the ascension rate 590 ft/min. Vertical speeds varied more (ascension rate greater) during turbulent conditions, but a uniform ascension rate could be assumed under all but extremely turbulent conditions or in unusually turbulent layers. The vector standard deviation of wind velocity ranged from 2 to 5 ft/sec with greater variability during turbulent conditions. The variability does not increase with increasing wind speed—in fact, the relative error is less than with light winds. *Subject Headings:* **1. Pilot balloon ascension rates 2. Vector standard deviation of winds 3. Turbulence effects on balloon ascent 4. Ralston, Alberta.**—*M.R.*

9.2–159 551.507.321.2:551.510.42:551.551.8

Lucas, D. H.; Spurr, G. and Williams, F., **The use of balloons in atmospheric pollution research.** *Royal Meteorological Society, Quarterly Journal*, 83(358):508–516, Oct. **1957.** 9 figs. **DWB**—Uncertain factors are height to which hot gas rises above chimney top, and rate at which dust separates from plume. A technique was developed to estimate dust deposition and gas concentration by use of balloons. A laminate of terylene and polythene, partially filled with hydrogen, gave best results. Balloons of zero buoyancy are emitted from the chimney and followed by naval rangefinder. It is considered that results are comparable

with those given by dust, gas molecules and smoke puffs. Some illustrative tracks are given. *Subject Headings:* **1. Atmospheric pollution measurement 2. No-lift balloons.**—*C.E.P.B.*

9.2–160 551.507.321.2:551.594.12

Masson, H. and Salvador, O., **Sur les phénomènes électriques qui accompagnent le gonflement d'un ballon sonde.** [Electric phenomena which accompany the inflation of a sounding balloon.] *La Météorologie*, Paris, Ser. 4, No. 43:289–292, July/Sept. **1956.** 3 figs., table. **DWB**—Carefully controlled experiments on the ion charge on the inside of a balloon made at Thiès and Dakar (80 km apart) in Jan.–May 1956, using O_2 and H_2 for inflation of balloons, show that very high voltages can be built up in balloons during inflation, especially with hydrogen and at low relative humidities, and that reducing the speed of inflation materially reduces the charge. At Thiès, Apr. 19, 1956, 800 V. were registered at 29°C and 32% R.H. (for hydrogen). The corresponding voltage with O_2 was 440 V. These charges would be sufficient to produce an explosion if the balloon were grounded suddenly, or while filling. *Subject Headings:* **1. Electrical charges inside hydrogen balloons 2. Balloon explosions 3. Balloon inflation 4. Dakar, French West Africa.**—*M.R.*

9.2–161 551.551.25:551.507.352

Notess, Charles B. and Eakin, Grady, **Flight test investigation of turbulence spectra at low altitude using a direct method for measuring gust velocities.** Cornell Aeronautical Lab., Inc., Contract AF 33(616)174, Report No. VVC-839-F-1, July 1, **1954.** 55 p. 22 figs. (incl. photos.), 11 refs., 14 eqs. **DWB**—A method was developed for measuring the character of atmospheric turbulence using an airplane as a probe. Time (or space) histories of the components of atmospheric turbulence were directly computed from the recorded data. These turbulence components are basically the difference between motions of the airplane relative to the ground and of the airplane relative to the air. The former was measured by rate and attitude gyros and translational accelerometers while the latter was measured by flight calibrated vane and pressure tube readings. Random function techniques were utilized to obtain typical power spectral densities of the atmospheric turbulence velocity components. These techniques are based on the application of NORBERT WIENER's generalized harmonic theory and JOHN TUKEY's sampling theory. An FH-1 aircraft was instrumented and two data runs were made to obtain data at a normal cruise altitude and at a landing approach altitude of 600 ft above the terrain. The data for the landing approach altitude were reduced to evaluate the feasability of the experimental technique. *Subject Headings:* **1. Turbulence spectrum 2. Turbulence measurement 3. Airplane observation.**—*Authors' abstract.*

9.2–162 551.507.362:551.551.5

Mason, Homer P. and Gardner, William N., **A limited correlation of atmospheric sounding data and turbulence experienced by rocket-powered models.** *U. S. National Advisory Committee for Aeronautics, Technical Note*, 3953, April **1957.** 51 p. 38 figs., 19 refs. **DWB, DLC**—Atmospheric turbulence as experienced by rocket-powered models and temperature lapse-rate data obtained from rawinsonde soundings have been analyzed and compared in 38 cases by using an assumed lapse-rate stability boundary. A limited correlation has been obtained which shows that a large percentage of turbulent conditions can be avoided by making rocket-model flight tests only during marginal or stable lapse-rate conditions. *Subject Headings:* **1. Atmospheric turbulence 2. Rocket soundings during stable lapse rate conditions 3. Turbulence avoidance.**—*Authors' abstract.*

INSTRUMENTS

See also: **Industrial instruments** (Holzbock), 9.2–11; **Actinometers** (Bossy, Pastiels), 9.2–29; **Satellite cosmic ray recorders** (Ludwig, Van Allen), 9.2–103; **Aerological data, Dairen, Manchuria,** 9.2–151; **Met. buoy,** 9.2–155; **Dust measurement** (Teichert), 9.2–181; **Air-borne measurement of freezing nuclei** (Murgatroyd, Garrod), 9.2–227.

9.2–163 551.508.953:551.521.18

Goody, R. M., **A simple grating spectrometer for sky-emission studies.** *Royal Meteorological Society, Quarterly Journal*, 83(358):517–521, Oct. **1957.** 4 figs., 7 refs. **DWB**—Lay-out and external optics for spectrometer employing a modified Ebert system are described and

illustrated. An emission spectrum from 1400 to 700 cm^{-1} with 3 air masses is shown. *Subject Heading:* **1. Spectrometers.**—*C.E.P.B.*

9.2–164 551.508.57:551.508 85

Decca Radar Ltd., [*London?*], **Decca windfinding radar.** London, **1957.** 12 p. figs.—Regular radiosonde ascents at upper air stations have led to techniques to measure elevation, azimuth and range of a simple cheap radar reflector. A system is described enabling various shapes to be assembled from a few inexpensive easily stored parts. Transmitter and receiver use a dish aerial 2.5 m diameter or a corner reflector system. WF1 operates in 3 cm band with a nominal peak power of 20 kW. Instructions and specification are given. *Subject Heading:* **1. Radar wind measurement.**—*C.E.P.B.*

9.2–165 551.508.762

Roth, L., **Messung der Wolkenhöhe am Tage.** [Measurement of cloud height by day.] *Umschau,* 57(20):614, Oct. 15, **1957.** fig. **DLC**—Describes a set-up in which an invisible modulated light spot is received by a photoelectric receiver and photocell with vertical axis. Both sender and receiver have parabolic mirrors. *Subject Heading:* **1. Cloud height indicators.** —*C.E.P.B.*

9.2–166 551.508.765

Peters, E., **Eine neue Methode zur Bestimmung des Gehaltes an flüssigem Wasser in Wolken und Nebeln nach F. Albrecht.** [A new method for determination of liquid water in clouds and fogs according to F. Albrecht.] *Zeitschrift für Meteorologie,* 11(4):118–124, April **1957.** 5 figs., tables, 9 refs., 16 eqs. **DLC**—Water drops falling on an electrically heated cylindrical rod are evaporated and the resulting temperature change of the rod measured. Theory is set out. Apparatus consists of 4 rods 0.6 cm diameter, 27 cm long, on a square frame; measurement is described, some results given and errors discussed. For slight wind speeds some modifications are necessary. *Subject Heading:* **1. Cloud water content meters.**—*C.E.P.B.*

9.2–167 551.508.77

*Hoehne, Walter E., **Technical evaluation of model XA rainfall rate and total catch indicator.** *U. S. Naval Research Laboratory, NRL Memorandum Report,* No. 613, July **1956.** 12 p. 2 figs., 3 plates, 3 tables. **DWB** (M08.77 H693t)—A fixed quantity of water at any given temperature and atmospheric pressure requires a known amount of heat energy to raise it to the boiling point temperature and convert it to vapor at the boiling point. The conversion of electrical energy to heat energy can be made 100% efficient, therefore, a given quantity of water at a known temperature and pressure will require a fixed amount of electrical energy to convert it into vapor. The model XA Rainfall Rate and Total Catch Indicator measures the rate at which electrical energy is used and the total energy expended which correspond respectively to the rate at which water is added and the total amount of water evaporated. By proper selection of catch basin size the above relation is used to measure the rate of rainfall and the total rainfall. The instrument was found to be of sound design basically but much of the possible accuracy and convenience was lost by defects in the design and manufacture of the auxiliary parts, such as the preheater, and failure to provide certain indicators and operation shields as, for example, a shield to prevent rain from entering the vaporization cell during a power failure. *Subject Headings:* **1. XA rainfall rate and total catch indicator 2. Instrument errors.**—*Author's abstract.*

9.2–168 551.508.91:551.574.1

Nolan, P. J. (*Univ. College, Dublin, Ireland*), **The photo-electric counter and its application for measuring diffusion coefficients.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers,* No. 42:113–119, Nov. **1955.** 2 figs., 2 tables, 10 refs., 10 eqs. **DLC** —In the photo-electric nucleus counter, a cloud is formed between a source of light and a photoelectric cell and the concentration of nuclei is estimated from the extinction of the light. Air containing the nuclei under investigation is drawn through a vertical tube 60 cm long and 4 cm in diameter for a sufficiently long time to insure that the air originally present is swept out.

The entrance and exit taps are closed and pure air is pumped in through a third tap until a suitable over-pressure is reached. A short time is allowed to elapse so that the air, taking up water from the lining of damp blotting paper, is saturated. The current from the photovoltaic cell is read by means of a galvanometer. A fourth tap on the tube is opened allowing the air to expand adiabatically. A cloud forms and the galvanometer reading drops quickly to a new value. An intrinsic calibration of the instrument has been carried out by means of a device which enabled the extinctions for any nuclear concentration and for exactly half that concentration to be determined accurately. The absolute values of the nucleus concentration are based on simultaneous determinations with an Aitken counter. The absolute accuracy is of the same order as that of the Aitken counter. The relative accuracy is higher. The development of the photo-electric method of counting has made it possible to employ with much precision a method already in use by which the size of condensation nuclei can be determined. If a stream of air containing particles of any kind is drawn slowly through a tube, particles will be lost by diffusion and fall under gravity. In order that the loss by diffusion should be large enough for accurate measurement it was found best to draw the air between parallel surfaces a small distance apart. When the surfaces are vertical the loss by gravity is negligible. By building a pile of plates a number of air streams in parallel are arranged. In this way a sufficiently slow air velocity may be obtained with a conveniently large total air flow. The ratio of the concentrations of nuclei entering and leaving is determined for a measured air flow. From these measurements and the dimensions of the diffusion box the diffusion coefficient of the nuclei can be obtained. The radii of the nuclei may be deduced from the diffusion coefficient by means of the Millikan form of the Stokes-Cunningham Law. *Subject Headings:* **1. Photoelectric nuclei counters 2. Nuclei diffusion coefficients.**—*Author's abstract.*

9.2–169 551.508.91:551.501.7

Woodcock, Alfred H. and Spencer, A. T., **An airborne flame photometer and its use in the scanning of marine atmospheres for sea-salt particles.** *Journal of Meteorology*, 14(5):437–447, Oct. **1957.** 9 figs., table, 20 refs. **DWB**—A flame photometer is described and illustrated for rapid use in an airplane for measuring airborne salt by amplifying and recording the average voltage across the photocell load resistor, which is proportional to the photocell current produced by sodium flashes in the flame. Results of 70 calibration tests in flights over sea are set out. Examples of results in clear air and cumulus clouds are shown; the latter (and "ghost clouds") are somewhat higher but there is considerable scatter. Improvements are being made to remove sources of error. *Subject Headings:* **1. Photometers 2. Air-borne photometers.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Hail prevention, Switzerland,** 9.2–35; **Forecasting in the Tokyo Weather Central** (Martin), 9.2–42; **Sea ice forecasting** (McGough), 9.2–52; **Forecasting for helicopter flights** (Willis), 9.2–111; **Local forecast studies** (Frost), 9.2–117; **Tropical cyclone occurrences, Australia** (Brunt, Hogan), 9.2–176.

9.2–170 551.509.1

Childs, A. J. (*Supt., Met. Communications, Canada*). **Meteorological communications.** *Weatherwise*, Boston, 9(2):47–48, April **1956.** photo. **DWB**—The Canadian Met. Service operates 28,000 mi of teletype (2 transcontinental and many north-south feeder lines) and 6000 mi of radio and wire facsimile network. The lines are maintained under lease arrangements, by the Canadian Pacific and Canadian National Railways. Especially rugged conditions are found in British Columbia and Northern Ontario. A coast-to-coast microwave system is now under construction and is partially in operation. Trans Canada Airlines, established in the late 1930's, required a telecommunications system and aviation forecast offices across the country. These were inaugurated in 1938 and the war more than doubled requirements. Facsimile charts are transmitted from Montreal analysis center and 5 regional centers. Radio teletype and facsimile circuits operate to Goose Bay, Churchill and Resolute in the far north. *Subject Headings:* **1. Meteorological networks 2. Communications networks 3. Canada.**—*M.R.*

9.2–171 551.509.3(54)

§Malurkar, S. L., **Notes on analysis of weather of India and neighbourhood—plates.** *India. Meteorological Dept., Memoirs*, 28(Pt. 4, Plates), **1956.** unpaged. 28 plates. **DWB**—The synoptic chart series (for abstract on text, *see* 2.6–29, June 1951, *MAB*) are presented along with charts showing the station network for India, the Arabian Sea and the Bay of Bengal, the rainfall divisions, etc. The series are 0300Z surface charts for May 3–25, 1943, June 18–July 6, 1943, Oct. 3–16 and 23–31, 1943, Feb. 27–March 5, March 31–April 7, 1944; 1200Z Oct. 3–29, 1944 and June 9–11 and Dec. 13–15, 1947 and Jan. 18–21, 1937. *Subject Headings:* **1. Synoptic series 2. India.**—*M.R.*

9.2–172 551.509.31:551.515

§Brown, Henry Albert, **Mesoscale systems post-cold frontal disturbances.** Chicago Univ. Dept. of Meteorology, Contract Cwb 8613, Technical Report (unnumbered), Nov. **1956.** 43 p. 23 figs., 2 refs. This is bound in its **Report** (unnumbered), Aug. 1, 1955–June 30, 1956. issued **1957. DWB** (M15 C532s)—The technique of meso-analysis applied to areas representing post-cold frontal conditions reveals very clearly the existence and behavior of medium scale disturbances. In particular, the case of June 27, 1953 is analyzed over an area which includes Colorado, Kansas, and Nebraska. Hourly charts of pressure, temperature and rainfall, and charts of upper air data are utilized in the investigation and are presented. *Subject Headings:* **1. Mesoanalysis 2. Synoptic analysis 3. Atmospheric disturbances 4. Middle West.**—*Author's abstract.*

9.2–173 551.509.31

Elliott, William P. and Brown, H. Albert, **A synoptic study of horizontal deformation.** Texas. Agricultural and Mechanic College. Dept. of Oceanography, Contract AF 19(604)-559, Scientific Report, No. 6, Feb. **1956.** p. 1–16. 5+ figs., 4 refs., 2 eqs.—Horizontal deformation plays an important part in modifying patterns of temperature, and it therefore should have a significant role in the growth and decay of fronts and major jet streams. The study of this role of deformation is handicapped by the difficulties in evaluating and analyzing deformation routinely on synoptic charts. The problem might be alleviated by applying known model patterns of deformation to the standard pressure charts. This study may be considered a preliminary test of the feasibility of this substitute approach. The results show that the model patterns give a reasonably good measure of the actual deformation, and that for most needs the substitute method should be the more efficient. *Subject Headings:* **1. Horizontal deformation 2. Forecasting techniques.**—*Authors' abstract.*

9.2–174 551.509.312:551.515.23

Kasahara, Akira, **The numerical prediction of hurricane movement with the barotropic model.** *Journal of Meteorology*, 14(5):386–402, Oct. **1957.** 14 figs., 2 tables, 13 refs., 59 eqs. **DWB**—In order to increase the accuracy of prediction of hurricane movement beyond that which has been obtained with methods now in use, a numerical procedure based upon the barotropic model is presented here. A vortex field is separated from the total flow to obtain the residual-steering flow field. By solving the equation for the steering field, which does not include any parameters related to the vortex, the prediction of the steering flow is executed in the ordinary manner. By solving the other equation, which includes the interaction terms between the hurricane and the steering flow, the movement of the vortex pattern is predicted. To make the latter problem more tractable, a velocity fomula for the movement of the vortex center is derived on the basis of a few reasonable assumptions concerning the structure of the vortex and of the steering field. The variables in the formula are expressed only in terms of quantities determined by the steering field and a single characteristic parameter related to the scale of the hurricane. By this means, a forecast of the hurricane movement can be programmed as a subroutine which is executed in the course of the prediction of the steering flow. Five cases of predicting the 24-hour and 48-hour movements of hurricane "Diane" and "Connie" (Aug. 1955) at the 500-mb level are presented here. These results have been obtained by the use of a high-speed computer, from initial maps which were re-analyzed using all available data. *Subject Headings:* **1. Numerical forecasting 2. Hurricane propagation.**—*Author's abstract.*

9.2–175 551.509.314:519.24

White, Robert M.; Derby, Royce C.; Cooley, Duane S. and Seaver, Florence A., **Hemispherical prediction by statistical techniques.** *Journal of Meteorology*, 14(5):448–457, Oct. **1957.** 6 figs., 2 tables, 9 refs., 4 eqs. **DWB**—A statistical procedure suitable for forecasting the hemispherical midtropospheric contour-height distribution is developed. Least-squares empirical filters are designed to yield the 24-hr 500-mb contour heights as functions of the preceding two-day sequence of contour heights at the same level. The results indicate that the statistical procedure may provide useful forecasts for twenty-four hours over regions of the hemisphere with adequate data coverage. The utility of the system for extended-range forecasting is also discussed. *Subject Heading:* **1. Statistical forecasting.**—*Authors' abstract.*

9.2–176 551.509.52:551.515.23

*Brunt, A. T. and Hogan, J., **Occurrence of tropical cyclones in the Australian Region.** (In: Tropical Cyclone Symposium, Brisbane, Dec. 1956, **Proceedings.** Pub. Dec. **1956.** p. 5–18. 4 figs., 8 tables, 5 refs.) **DWB**—The incidence of Australian tropical cyclones is examined and historical facts illustrating the behavior of past cyclones are presented, in order to build up climatological data which will be of assistance to forecasters. The frequency of storms and their directions of movement through five degree latitude squares are studied to establish seasonal patterns in their behaviour. The monthly frequencies of east and west coast cyclones are established, and the length of the season is defined by a detailed analysis of cyclone days. The probabilities of cyclones endangering different sections of the Australian coastline are calculated and climatic trends studied with regard to changes in the overall seasonal frequency. *Subject Headings:* **1. Tropical cyclone frequencies 2. Tropical cyclone tracks 3. Australia.**—*Authors' abstract.*

WEATHER MODIFICATION

See also: **Tucson Conference on Weather Modification** (Dessens), 9.2–69.

9.2–177 551.509.617

Decker, Fred W.; Lincoln, Russell L. and Day, John A. (*all, Dep. of Physics, Oregon St. College, Corvallis*), **Analysis of cloud seeding efforts in the Tri-County Area, Oregon, 1950–54.** *American Meteorological Society, Bulletin*, 38(3):134–137, March **1957.** 2 figs., 2 tables, 3 refs. 2 eqs. **DWB, DLC**—A multiple regression equation (11 variables) was used to test results of cloud seeding with silver iodide in 1950–54 in 3 counties (Sherman, Gilliam and Morrow) of N. Central Oregon. Precipitation was tested for 7 stations in target area and 4 in Western Oregon (upwind) and records going back to 1930 incorporated in tests. Results show a 6% increase but a 15% increase would be required to be of any significance. A +18–19% increase was obtained on 2 of the 4 years and a −14% and −2% decrease on the other 2 (alternate) years. *Subject Headings:* **1. Cloud seeding evaluation 2. Silver iodide seeding effectiveness 3. Cloud seeding in Oregon 4. North Central Oregon.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

See also: **Satellite air density measurements** (Jones, Bartman), 9.2–102.

9.2–178 551.510.41:546.11

Glueckauf, E. and Kitt, G. P., **The hydrogen content of atmospheric air at ground level.** *Royal Meteorological Society, Quarterly Journal*, 83(358):522–528, Oct. **1957.** 2 figs., 2 tables, 18 refs. **DWB**—A method is described for the separation and determination of hydrogen in air samples of approximately 200 liters N.T.P. by volume. The hydrogen is fractionally distilled from the bulk of the sample, oxidized to water by passing over heated copper oxide and finally condensed in a trap cooled in liquid oxygen. After freeing from the contaminating gases by pumping, the water is released from the trap and measured as vapor in a small calibrated volume. Although the accuracy of the method in its present form is not better than ±10 percent, the results seem to indicate that the hydrogen content of atmospheric air is a

varying quantity. The average hydrogen content of air at ground level is 0.6 part per million. *Subject Headings:* **1. Atmospheric composition 2. Hydrogen content of air.**—*Authors' abstract.*

9.2–179 551.510.41:546.214

*Teichert, F. and Warmbt, W., **Ozonmessungen Dresden-Wahnsdorf und Fichtelberg 1954/55.** [Ozone measurements Dresden-Wahnsdorf and Fichtelberg 1954/55.] *Zeitschrift für Meteorologie*, 10(9):264–277, Sept. **1956.** 7 figs., 9 tables, 10 refs. **DLC**—Measurements at Wahnsdorf (Dresden) 1952–55, Fichtelberg (mountain station) 1954–55 and a number of other stations in 1955 are discussed. The annual average was: Wahnsdorf 12.4–8.3 γ/m^3, Fichtelberg 42.3–35.0. Monthly means varied considerably with thermal processes of weather; maximum was in spring and early summer, minimum in fall and early winter. At Fichtelberg the annual range was great, the amount being 4 times Wahnsdorf in summer and 8 times in winter. Curves or tables show annual variation at different hours, and diurnal variation with different types of weather and different wind directions. At Wahnsdorf the diurnal variation is related to vertical austausch. *Subject Headings:* **1. Ozone measurements 2. Germany.**—*C.E.P.B.*

ATMOSPHERIC POLLUTION

See also: **Atmos. pollution symposia,** 9.2–5; **Atmos. pollution effects on conifers** (Abramashvili), 9.2–128; **Atmos. pollution research with balloons** (Lucas et al.), 9.2–159.

9.2–180 551.510.42:551.577.33:551.578.43:523.51

Bowen, E. G., **A prediction of a meteor orbital period.** *Observatory*, London, 77(898):99–102, June **1957.** fig., table, 10 refs. **DLC**—Further evidence is presented of the nucleation hypothesis of meteor dust, giving peaks on Jan. 5, 14, 22 and 31. That of Jan. 5 would be due to a meteor shower on Dec. 5–6. First snow cover at Tokyo (1632–1954) occurs on Jan. 4–6 at an average interval of 11.4 years. *Subject Headings:* **1. Meteor influences 2. Rainfall periodicities 3. Snow cover periodicities 4. Japan.**—*C.E.P.B.*

9.2–181 551.510.42 551.508.91

Teichert, F., **Die Verstaubung der Luft in Abhängigkeit von meteorologischen Faktoren.** [The dustiness of the air depending on meteorological factors.] *Zeitschrift für Meteorologie*, 11(4):112–118, April **1957.** 3 figs., 8 tables, 13 refs. **DLC**—In Wahnsdorf in 1956 continuous dust measurements for 11 hrs daily were made with two simplified home-built conimeters, briefly described. A year's results are tabulated. Dust content of outside air was very variable, as well as decreasing from winter to summer. Results are related to visibility, air mass, cloudiness, weather type and wind force and direction. *Subject Headings:* **1. Dust content of air 2. Dust meters.**—*C.E.P.B.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Upper air wind and temp.** (Murgatroyd), 9.2–27; **Standard atmosphere** (U.S.N.A.C.A.), 9.2–37; **Upper air climatology** (Martin), 9.2–41; **Ionospheric currents above thunderstorms** (Stergis et al.), 9.2–267; **Ionospheric irregularities and radio fading** (Bowhill), 9.2–275.

9.2–182 551.510.5

ICAO standard atmosphere. *Science*, Wash., D. C., 124(3231):1071, Nov. **1956. DLC**—The ICAO standard atmosphere has been extended to 300 km by agreement of 23 U. S. scientific and engineering organizations. The information is available from the Committee on Extension to the Standard Atmosphere, Geophysics Research Directorate, 415 Summer St., Boston 10, Mass. *Subject Headings:* **1. ICAO standard atmosphere 2. Extension of standard atmosphere 3. U. S. Air Force. Geophysics Research Directorate.**—*M.R.*

9.2–183 551.510.5:551.507.362

Michigan. Univ. Engineering Research Institute, **Atmospheric phenomena at high altitudes, May 1–July 31, 1956; Aug. 1–Oct. 31, 1956 and Nov. 1, 1956–Jan. 31, 1957.** Con-

tract DA-36-039-SC-64659, Quarterly Reports, Sept. **1956**; Jan. **1957** and March **1957.** 3 pieces. 19 p. ; 42 p.; and 21 p. figs., tables. **DWB** (M10.5 M624ad)—These are the fifth, sixth and seventh in a series of Quarterly Reports on a project whose purpose is to adapt the rocket-grenade experiment for use in the Arctic during the IGY, to collect and analyze upper-air samples and to engage in the general investigation of upper-air problems. The fifth and sixth Reports give engineering details of the grenade and instrumentation sections of Aerobees. The seventh report includes an account of a successful launching of Grenade Aerobee SM1:01 at Fort Churchill. *Subject Headings:* **1. Rocket grenade experiments 2. Upper atmosphere research. I. Bartman, F. L. II. Wilkie, W. J. III. Liu, V. C. IV. Otterman, J. V. Wenzel, E. A.**—*G.T.*

9.2–184 551.510.535:523.74

Beynon, W. J. G. and Brown, G. M., **Ionospheric indices of solar activity.** *Journal of Atmospheric and Terrestrial Physics*, 11(2):128–131, **1957.** 3 figs., 8 refs. **DWB**—Variations of monthly mean character figure fE follow sunspot number R very closely, and it is probably a very sensitive index of ionizing radiation. It is concluded that $f^n/\cos\chi$ is an index of ionizing intensity. This is illustrated for Lindau and Slough. *Subject Headings:* **1. E layer 2. Solar activity.**—*C.E.P.B.*

9.2–185 551.510.535:551.594.7

Hibberd, F. H., **Self-distortion of radio waves in the ionosphere, near the gyro frequency.** *Journal of Atmospheric and Terrestrial Physics*, 11(2):102–110, **1957.** table, 9 refs., 14 eqs. **DWB**—In a previous paper (1956) the self-distortion (or self-interaction) of a low frequency radio wave in the ionosphere was considered, neglecting the earth's magnetic field, and it was shown that self-distortion results in a small reduction of the modulation depth of a modulated wave. The theory is extended here, with the inclusion of the magnetic field, for frequencies near the gyro frequency. It is shown that the reduction in modulation depth varies only slowly with wave frequency near the gyro frequency, and shows no resonant-like variation. The reduction is proportional to the power radiated, is greatest for low modulation frequencies and decreases rapidly as the modulation frequency is increased. With 100 kW radiated, the fractional reduction in modulation depth of a modulated gyro wave is expected to be of the order of 1 part in 100. Recent experiments that have been claimed to have demonstrated large self distortion effects near the gyro frequency are discussed. *Subject Heading:* **1. Radio wave propagation disturbances.**—*Author's abstract.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Heat transfer** (Gröber, Erk), 9.2–10; **Energy balance method of evaporation calculation** (Bernard), 9.2–28; **Eddy viscosity** (Buajitti, Blackadar), 9.2–220.

9.2–186 551.511:550.3:532.5

Corrsin, Stanley, (*Johns Hopkins Univ., Baltimore, Md.*), **Dimensional analysis and similarity.** *U. S. Office of Naval Research, Proceedings of the First Symposium on the use of Models in Geophysical Fluid Dynamics, Sept. 1953*, pub. **1956.** p. 1–17. 4 figs., table, 8 refs., 26 eqs. **DWB, DLC** (QC809.F5U5)—A clear and detailed review of the concept of dimension and the entire field of dimensional analysis, leading up to a discussion of applications in geophysics and meteorology through the use of models. The concept of similarity, partial similarity and asymptotic cases where a parameter disappears are also applied to atmospheric phenomena. Reynolds, Froude, Rossby and Mach numbers fall within the purview of this discussion. *Subject Headings:* **1. Dimensional analysis 2. Similarity in fluid models 3. Fluid models in geophysics.**—*M.R.*

9.2–187 551.511.32:551.558

Bodolai, István, **A függöleges légmozgások formáiról.** [On different types of vertical movement in the atmosphere.] *Időjárás*, Budapest, 60(6):385–388, Nov./Dec. **1956.** 4 refs., 5 eqs. **DLC**—Various types of vertical movement occurring in the atmosphere and their effects on cloud and precipitation formation are briefly discussed. Diubiuk's equations of

motion for (a) calculating vertical motions due to convergence or divergence, by using the pressure field (1947) and (b) determining vertical ascending currents due to warm-front friction (1951) are reviewed. *Subject Headings:* **1. Vertical motion 2. Vertical currents 3. Equations of motion.**—*G.T.*

9.2–188 551.511.6

Buell, C. Eugene, **Synoptic scale motion of the atmosphere as two dimensional isotropic turbulence.** *Journal of Meteorology*, 14(5):471–472, Oct. **1957.** 2 figs., 2 tables, 2 refs., 4 eqs. **DWB**—The components of the correlation tensor were computed for a number of stations from 500 mb data for Dec., Jan. and Feb. It is concluded that the assumption that synoptic-scale motions of "the atmosphere may be treated as an aspect of homogeneous isotropic turbulence in an incompressible two-dimensional flow is not strictly valid" but is an approximation. *Subject Heading:* **1. Isotropic turbulence.**—*C.E.P.B.*

9.2–189 551.511.6:551.551.21

Deacon, E. L., **Wind profiles and the shearing stress: an anomaly resolved.** *Royal Meteorological Society, Quarterly Journal*, 83(358):537–540, Oct. **1957.** 2 figs., 10 refs., 2 eqs. **DWB**—The logarithmic relationship for aerodynamically rough flow underestimates shearing stress under stable conditions. This is traced to a marked rise of shearing stress/density $\times$(velocity)^2 when wind speed at 15 cm $<$1.5 m/s. This is because Reynolds number of flow about grass blades is too low for fully rough flow. *Subject Heading:* **1. Shear stress.**—*C.E.P.B.*

9.2–190 551.511.6:551.551.5:532.517.4

Ellison, T. H., **Turbulent transport of heat and momentum from an infinite rough plane.** *Journal of Fluid Mechanics*, London, 2(5):456–466, July **1957.** 17 refs., 27 eqs. **DLC**—In the first part of the paper the dimensional laws governing the processes of heat and momentum transport from an infinite rough plane are assembled and their consequences set out. In the second part, the detailed equations for the turbulent energy, the mean square temperature fluctuation and the covariance of temperature and vertical velocity are used, together with some speculative assumptions concerning the dissipative action of the turbulence, to derive a series of relations between the turbulent intensities and the *Austausch* coefficients. One of these relations indicates that the flux form of the Richardson number cannot exceed a critical value which is about 0.15. It follows that in highly stable conditions the buoyancy forces have little direct effect on the turbulent energy balance, their action being primarily to cause a reduction in the scale of the motion and some change in its structure. *Subject Headings:* **1. Turbulent transfer of heat 2. Turbulent transfer of momentum.**—*Author's abstract.*

9.2–191 551.511.6:551.551.8

†Gifford, Frank, Jr., **Relative atmospheric diffusion of smoke puffs.** *Journal of Meteorology*, 14(5):410–414, Oct. **1957.** 2 figs., 17 refs., 11 eqs. **Further data on relative atmospheric diffusion,** *Ibid.*, 475–476, 2 figs., 5 refs. **DWB**—The spreading of smoke puffs in the atmosphere should be governed by the laws of relative diffusion that have been advanced by BRIER and by BATCHELOR, and not (contrary to what has been previously assumed) by TAYLOR's fixed-source diffusion law. The predicted mean-square puff spreading should proceed as time cubed, according to BATCHELOR's similarity theory of relative diffusion. Recent detailed smoke-puff measurements reported by FRENKIEL and KATZ, and KELLOGG, make it possible to test the similarity theory of relative diffusion. Examination of these data indicates the existence of a t^3 spreading regime. Values of the rate of eddy-energy dissipation are also inferred from the smoke-puff data. (Data supporting the cube law after about 60 sec are given on p. 475–476.) *Subject Headings:* **1. Atmospheric diffusion 2. Smoke puffs.**—*Author's abstract.*

9.2–192 551.511.6:551.558.1:536.2

Thomas, D. B. and Townsend, A. A., **Turbulent convection over a heated horizontal surface.** *Journal of Fluid Mechanics*, London, 2(5):473–492, July **1957.** 15 figs., 3 tables, 9 refs., eqs. **DLC**—Detailed measurements have been made of the temperature field in natural convection above a heated horizontal surface in air, with and without a cold upper

boundary. The object was to provide experimental material for the testing of existing theories of convection and the development of new ones. Using a variety of experimental techniques, it was possible to measure the heat transfer, the mean temperature profiles, mean squares of the temperature fluctuations and the autocorrelation functions of the temperature fluctuations. These results are considered in relation with the "similarity" theory of PRIESTLEY and the "neutral stability" theory of MALKUS. Both these theories lead to the conclusion that, for convection between parallel planes at high Rayleigh numbers, nearly the whole of the mean temperature variation occurs in comparatively thin surface layers whose mutual interaction is small. The present experiments confirm this in some detail, but the exact form of the variation of mean temperature cannot be completely reconciled with either of the theories. *Subject Heading:* **1. Turbulent convection.**—*Authors' abstract.*

GENERAL CIRCULATION

See also: **Jet stream turbulence** (Scorer), 9.2–212.

9.2–193 551.513.1:551.511

Yeh, Tu-Cheng (*Inst. of Geophysics and Met., Academia Sinica*) and Yang, Ta-Sheng (*Peking Univ.*), **The annual variation of the atmospheric angular momentum of Northern Hemisphere and the mechanism of its transfer.** *Scientia Sinica*, Peking, 5(3):561–574, Sept. **1956.** fig., 18 refs., 19 eqs. **DLC.** "First published in Chinese in *Acta Meteorologica Sinica*, Peking, 26(4):281–294, **1955.**"—The mean seasonal variation of angular momentum in the atmosphere N. of 30°N is discussed, and then the annual variation of atmospheric angular momentum from 0° to 30°N, the angular momentum transfer through the boundary surface between westerlies and easterlies and, finally, when and where and how the angular momentum is transferred northward are treated. The conclusion is that the northward transfer of angular momentum by large scale weather features more than compensates for loss by friction, that the annual variations in momentum transfer is not symmetrical because heat loss is not the reverse of heat gain (i.e., in fall and spring), and the transfer of any momentum from easterlies to westerlies occurs at the place and time of "low index" troughs or ridges and mainly at high levels. Upward transfer must be by vertical motions, not horizontal. *Subject Headings:* **1. Angular momentum transfer 2. Annual momentum transfer variations.**—*M.R.*

ATMOSPHERIC DISTURBANCES

See also: **Winds and weather, Antarctica** (Lamb), 9.2–59; **Tropical cyclone symposia, Brisbane** (Hilder), 9.2–71; **Tropical cyclone symposia, Brisbane** (Cowan), 9.2–72; **Storm frequency, N. Atlantic** (Rodewald), 9.2–86; **Hurricane wave statistics, Gulf of Mexico** (Wilson), 9.2–95; **Weather hazards in off shore drilling** (Malone), 9.2–131; **Deviation of contour heights and vector deviation of wind** (Thompson), 9.2–143; **Mesoanalysis of disturbances** (Brown), 9.2–172; **Numerical forecasting of hurricane movement** (Kasahara), 9.2–174; **Ionospheric currents above thunderstorms** (Stergis et al.), 9.2–266.

9.2–194 551.515.1

Gabites, J. F. (*New Zealand Met. Service*), **A survey of tropical cyclones in the South Pacific.** (In: Tropical Cyclone Symposium, Brisbane, Dec. 1956, **Proceedings.** Pub. Dec. **1956.** p. 19–24, 4 figs., 5 refs.) **DWB**—Tropical cyclones occurring in the South Pacific between long. of 150°E and 150°W during the years 1940–56 have been traced from synoptic charts. Those cyclones that are known to have had winds reaching Beaufort force 9 are found to occur in a fairly well-defined cyclone season from Dec. to March and to average four per season. The initial vortex usually forms west of 170°W, between lat. 8°S and 18°S, often at some form of intertropical convergence zone. Initial movements to the west predominate in Feb.; to the east in other months. *Subject Headings:* **1. Tropical cyclone formation 2. Cyclone tracks 3. South Pacific.**—*Author's abstract.*

9.2–195 627.51:551.515.2:551.461.2

*Savage, Rudolph P., **Model tests of wave run-up for hurricane protection project.** *U. S. Beach Erosion Board, Bulletin*, 11(1):1–12, July **1957.** fig., 8 tables, ref. **DWB, DLC**—Wave

run-up was measured in an experimental arrangement consisting of a wave generator and a scale replica of a representative coastal section. The purpose of the study was to serve as a basis for the placement of sand fills designed to provide protection against flooding by high tides and waves associated with hurricanes. Data on the wave heights and run-up heights obtained are tabulated. *Subject Headings:* **1. Hurricane flood protection 2. Wave run-up heights 3. Hurricane tides.**—*G.T.*

9.2–196 551.515.23

Ewing, Ann, **Hurricane's zig-zag's probed.** *Science News Letter*, Wash., D. C., 69(23): 362-363, June 9, **1956.** photo. **DWB, DLC**—Radar coverage of hurricane areas in 1956 was scheduled to begin on June 1. Special attention will be paid to zig-zag tracks, since the difference between a hit or a miss in a heavily populated area may depend on correctly forecasting the zig or zag. At the Center for Research, under ROBERT SIMPSON, it was discovered that the northward shift of trade wind and westerly belts in 1954 and 1955 has resulted in a shift in hurricane tracks. Use of electronic computers in hurricane forecasting, radar equipped airplanes, energy balance in hurricanes, attempts at modification of hurricanes, oceanographic cruises for 5 months of season in area, and storm surge studies are discussed. *Subject Headings:* **1. Hurricane research 2. Hurricane tracks.**—*M.R.*

9.2–197 551.515.23:551.526.6

§*Fisher, Edwin L., **Hurricanes and the sea surface temperature field (and) The exchange of energy between the sea and the atmosphere in relation to hurricane behavior.** *U. S. Weather Bureau, National Hurricane Research Project Report*, No. 8, June **1957.** 46 p. 39 figs., table, 19 refs. **DWB** (M15.2 U5845r)—"First paper appeared originally as N. Y. Univ. College of Engineering. Research Div. Dept. of Meteorology and Oceanography, Contract Cwb-8631, Technical Paper, No. 1, July 1956. Second paper appeared originally as its Contract Cwb-8948, Technical Paper No. 2 (and Final Report on the Hurricane Project), Jan. 1957." Pt. I is a study of how the sea surface temperatures in the vicinity of hurricanes affected their path and development or weakening. Eleven hurricanes which occurred in the West Indies region in 1953–5 were studied individually. It was concluded that hurricanes do tend to follow warm water areas in the belt of easterlies and that when shearing did force the hurricane from a warm water to a cold water area the storms weakened or died out. Causes are explored in Pt. II. Previous attempts to work out the energy flux over the sea (SUTTON, SVERDRUP, JACOBS and others) are reviewed and JACOBS equation applied to the data to test synoptically the possible mechanism for the observed relations. The hurricanes seem to respond to changes in eddy energy flux, even to the point of possible weakening when stationary (due to cold water being brought to the surface.) *Subject Headings:* **1. Hurricane track-sea temperature relationships 2. Sea surface temperature effects on hurricanes 3. Hurricanes, West Indies (1953–5) 4. West Indies.**—*M.R.*

9.2–198 551.515.2

Malkus, Joanne Starr, **The origin of hurricanes.** *Scientific American*, N. Y., 197(2):33–39, Aug. **1957.** 8 fig. (incl. photos). **DWB, DLC**—The normal cloud and wind, pressure and upper air regime of the sub-tropics or trade wind belt is discussed and the interruption of this normal regime by "easterly waves" given as the precursor of a cyclonic development. Precipitation and clouds extending to great heights usually occur in and behind an easterly wave—only when a vortex and a warm core "eye" develop is a hurricane indicated. Sometimes an eye is present but due to its "cold core" structure, development does not take place. Large vivid cloud photos taken from reconnaissance planes are presented along with schematic drawings. *Subject Headings:* **1. Hurricane formation 2. Easterly waves.**—*M.R.*

9.2–199 551.515.3:35(774)

Tornado! *Civil Defender*, Mobile, Alabama, 1(10):24–25, May **1956.** 4 photos. **DWB, DLC**—A short illustrated vivid description of Civil Defense activities before, during and after

the tornado that hit Grand Rapids, Mich., and suburbs on April 3, 1956, leaving 16 people dead and >200 injured, but many lives were saved by warnings and prompt Civil Defense action. It is said that only 5 tornadoes had occurred in Michigan in the past 100 yrs. *Subject Headings:* **1. Tornado damage 2. Tornado, Grand Rapids, Mich. (April 1956) 3. Civilian defense activities in tornado areas 4. Grand Rapids, Mich.**—*M.R.*

9.2–200 551.515.31

§Fujita, Tetsuya, **Mesoanalysis of the Illinois tornado of April 9, 1953.** Chicago Univ. Dept. of Meteorology, Contract Cwb 8613, Technical Report (Unnumbered), Nov. **1956.** 18 p. 28 figs., 6 refs. This is bound in its **Report** (unnumbered), Aug. 1, 1955–June 30, 1956. Issued Feb. **1957. DWB** (M15 C532s)—Original radar film of Illinois tornado was analyzed with the additional use of surface observation from stations in the vicinity. It is known that the surface tornado was located south of the center of Brook's tornado cyclone, beneath the circle of maximum wind surrounding the center, and that the energy necessary to maintain tornado rotation was supplied by the wind maximum circle. A favorable area for tornado initiation is known to be located on the southern extension of the dividing line of heavy and light rain beneath the mother cloud. After examination of the movement of the tornado cyclone, it is suggested that the Magnus' force, acting upon the tornado cyclone toward the high pressure side, plays an important role. *Subject Headings:* **1. Mesoanalysis 2. Tornado, Urbana, Ill. (April 1953) 3. Tornado dynamics 4. Illinois.**—*Author's abstract.*

9.2–201 551.515.4:551.594.21

Wormell, T. W. (*Cavendish Lab., Univ. of Cambridge, England*), **Theories of thunderstorm electrification: some general considerations.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers,* No. 42:157–161, Nov. **1955.** fig., 15 refs. **DLC**—The paper will consider certain conditions which a successful theory of charge generation in thunderclouds must satisfy and will then attempt briefly to assess the adequacy of various processes which have been suggested. The importance of electrical "influence" mechanisms will be emphasized, not merely in terms of the original WILSON theory, but more particularly with regard to their effects in modifying or limiting the results of other mechanisms. *Subject Heading:* **1. Thunderstorm electrification theories.**—*Author's abstract.*

9.2–202 551.515.81:551.43

§Ozorai, Zoltán, **Az orografikus okklúzió a Kárpát-medencében.** [Orographic occlusion in the Carpathian Basin.] *Időjárás,* Budapest, 60(6):329–341, Nov./Dec. **1956.** 10 figs., 6 tables. German summary p. 329. English translation p. I–IX. **DLC**—Orographic occlusions develop in the Carpathian Basin after strong cold invasions from the north. For a better understanding of this phenomenon the synoptic situation of Feb. 16–23, 1954 is analyzed in detail. The mechanism of the development of an orographic occlusion is shown by means of surface charts, upper-air charts and diagrams, and meteorological data. Annual frequencies of orographic occlusions in Hungary (1946–1955) are also discussed. The conclusions derived are applicable to synoptic analysis and forecasting. *Subject Headings:* **1. Orographic occlusions 2. Synoptic analysis 3. Carpathian Basin.**—*Trans. of author's abstract.*

9.2–203 551.515.81

Palmer, Clarence E., **Some kinematic aspects of frontal zones.** *Journal of Meteorology,* 14(5):403–409, Oct. **1957.** 6 figs., 3 refs., 11 eqs. **DWB**—"Singular lines" of V. BJERKNES are not zero lines but asymptotes of convergence (not always fronts) or divergence along which wind may reach any magnitude. A front is a continuous mixing zone between two air masses. This is illustrated by distribution of density. Streamline patterns are drawn with stationary and moving fronts. Vertical motion is defined and 7 rules governing simple types of frontal zones are derived. *Subject Headings:* **1. Frontal theory 2. Frontal zones.**—*C.E.P.B.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Heat transfer** (Gröber, Erk), 9.2–10; **Radiation on vertical surfaces, Leopoldville** (De Coster et al.), 9.2–30; **Spectrophotometer readings, Chesapeake Bay** (Burt), 9.2–93; **Satellite cosmic ray recorders** (Ludwig, Van Allen), 9.2–103; **Cloud effects on sky brightness** (Barr et al.), 9.2–116; **Solar refrigerators** (Trombe, Foëx), 9.2–130; **Solar water heaters** (Farber et al.), 9.2–133; **Solar distillation of salt water,** 9.2–139; **Spectrometer for emission study** (Goody), 9.2–163; **Solar radiation and ice ages** (Simpson), 9.2–254; **Bioclimatology of light** (Lippert), 9.2–258.

9.2–204 551.521.1

Berliand, T. G. and Efimova, N. A., **Mesiachnye karty summarnoĭ solnechnoĭ radiatsii i radiatsionnogo balansa territorii Sovetskogo soiuza.** [Monthly charts of global radiation and radiation balance in the U.S.S.R.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* 50(112):48–82, **1955.** 28 figs., 19 refs. **DAWS**—Charts with isolines of monthly totals of radiation balance for each month for the entire territory of the U.S.S.R. are presented; the isolines are in k cal/cm² and the intervals are 1 k cal/cm². The techniques used to construct those more precise charts, the annual variation of the range of total radiation and of radiation balance in the U.S.S.R., the albedo of various surfaces, etc., are discussed. *Subject Headings:* **1. Global radiation charts 2. U.S.S.R.**—*I.L.D.*

9.2–205 551.521.12(058)

*Czechoslovakia. Hydrometeorologický Ústav, **Aktinometrické merania v ČSR.** [Actinometric measurements in Czechoslovakia] **1954 and 1955.** Issued Prague, **1954** and **1955.** About 55 p. each. Almost entirely tables. **DWB** (M21.12 C998a)—Data for 7 actinometric stations in Czechoslovakia (18 in 1955) are published in extenso, for every observation during each month of the year in question. Several observations are taken a day on some days—on other days no observations are made. Cloudiness, wind and visibility are reported along with total direct radiation in ly/minute, and radiation with blue and red filters (OG-1 and RG-2). In addition the 1955 issue contains data on relative and absolute air mass, station pressure, vapor pressure, Linke Turbidity Factor for <6250 Å and >6250 Å. Mountain stations give cloud and cloud type below as well as above stations. *Subject Headings:* **1. Actinometric yearbooks 2. Solar radiation data.**—*M.R.*

9.2–206 551.521.14

Preisendorfer, R. W., **Exact reflectance under a cardioidal luminance distribution.** *Royal Meteorological Society, Quarterly Journal,* 83(358):540–543, Oct. **1957.** table, 5 refs., 32 eqs. **DWB**—The cardioidal luminance distribution has the form

$$B(\theta,k)=B(\pi/2,k)(1+k\cos\theta),-1\leqq k<\infty,0\leqq\theta\leqq\pi/2.$$

This is used to obtain numerical values of the reflectance for a given set of values of k and relative index of refraction m. Previous results are extended in a highly mathematical discussion and a table of spectral reflectance of a surface between two optical media is given. *Subject Heading:* **1. Luminance distribution.**—*C.E.P.B.*

9.2–207 551.521.18

*Adel, Arthur, **Infrared spectroscopy of the sun, moon and earth.** Arizona. State College, Flagstaff, Contract AF 19(122)-198, Final Report, March 10, **1957.** 65 p. refs. at end of each ch. **DWB** (M21.61 A719i)—The various aspects of infrared radiation and spectroscopy, reported in this monograph include the origin of atmospheric nitrous oxide and the nitrogen cycle in the air and soil; the grating solar spectrum from 5.6 to 1.9μ; the atmospheric window from 16–24μ and the second fundamental of nitrous oxide; infrared spectrum of CO_2; seasonal variation in absorption by O_3 at 9.6μ, the solar-terrestrial parameter ERTOR, and the 10-week cycle in solar variability, vertical O_3 distribution, and rates of temp. change in atmosphere due to 9.6μ radiation of O_3, etc. ERTOR is Effective radiation temp. of ozone region. VODARO is Vertical O_3 distribution from absorption and radiation by ozone. A 10-week cycle was found (5 complete cycles), amounting to 7°C, in ERTOR since July 1953. *Subject*

Headings: **1. Infrared radiation studies 2. CO_2 spectrum 3. O_3 spectroscopy 4. Solar variations 5. ERTOR 6. VODARO. I. Arizona. State College, Flagstaff.**—*M.R.*

9.2–208 551.521.64

Ogilvie, K. W. (*Univ. Sydney, Sydney, N.S.W. Australia*), **A note on the zenith angle dependence of cosmic ray protons at sea level.** *Canadian Journal of Physics*, Ottawa, 34(10):1081–1086, Oct. **1956.** 2 figs., 4 tables, 9 refs., eqs. **DWB, DLC**—A "heavy particle selector" used as a proton detector at sea level and high altitudes, is described and its use to study the angular dependence of protons in the momentum range from 700 to 1100 Mev/c indicated. Some of the experimental results obtained at Ottawa, Canada (320 ft elev.) are presented in tables and figures and are analyzed and compared with results obtained at 3300m elev by G. E. MILLER et al. (1954) and by F. M. CHARBONNIER et al. *Subject Headings:* **1. Zenith angle distribution of cosmic rays 2. Protons.**—*M.R.*

TEMPERATURE

See also: **Upper air temp.** (Murgatroyd), 9.2–27; **Frost data, Minnesota,** 9.2–120.

9.2–209 551.524.32:551.524.36

*Kangieser, Paul C. (*U. S. W. B. Airport Station, Phoenix, Ariz.*), **Possible singularity in the January minimum temperature at Phoenix, Arizona.** *Monthly Weather Review*, Wash., D. C., 85(2):42–44, Feb. **1957.** fig., 2 tables, 2 refs., eqs. Comment by Arnold Court; reply by Kangieser. *Ibid.*, 85(9):303–304, Sept. **1957. DWB, DLC**—Daily minimum temperature averages for the Phoenix City Office based on 61 yrs of record show a definite rise in the period Jan. 9–17, with relatively lower values in the 9-day periods preceding and following. This rise is investigated statistically and shown to be greater than chance would allow if random effects alone are responsible for the phenomenon. The possibility of a relationship between the Phoenix singularity and those demonstrated by WAHL (*see* 4.7–106, July 1953, *MAB*) for stations in the eastern United States is discussed briefly. *Subject Headings:* **1. Temperature singularities 2. Minimum temperatures 3. Phoenix, Ariz.**—*Author's abstract.*

9.2–210 551.524.35(431)

Teich, Martin, **Die Erhaltungsneigung der Temperaturanomalien nach den Pentadenwerten für Potsdam.** [The persistence tendency of temperature anomalies according to pentad values for Potsdam.] *Zeitschrift für Meteorologie*, 11(4):105–112, April **1957.** fig., tables, ref. **DLC**—Pentad values of temperature at Potsdam 1877–1956 are analyzed for temperatures of pentads following pairs showing a rise or fall. The basic probability of warm pentads exceeds 50% Oct.–Feb., <50% March–Sept. A persistence tendency is almost continuously present, especially in cold periods. This is analyzed in detail. Relations with next pentad but one are then considered. *Subject Headings:* **1. Temperature persistence 2. Potsdam, Germany.**—*C.E.P.B.*

9.2–211 551.524.7

Lowenthal, Marvin J., **Abnormal mid-stratospheric temperatures.** *Journal of Meteorology*, 14(5):476, Oct. **1957. DWB**—Peak temperatures −3°C at 10 mb at Fort Churchill on Feb. 5, 1957 and −3.5°C at Salem on Feb. 6. Data confirm that abnormal stratospheric warmings occur when sun is quiet. *Subject Heading:* **1. Upper air temperature extremes.**—*C.E.P.B.*

SEA TEMPERATURE

See: **Sea temp. variations** (Tabata), 9.2–91.

PRESSURE AND WIND

PRESSURE

See: **Deviation of contour heights and vector deviation of wind** (Thompson), 9.2–143; **Diurnal pressure variation** (Bartrum), 9.2–216.

TURBULENCE AND GUSTINESS

See also: **Gust effects on aircraft** (Ribner), 9.2–113; **Turbulence along the Itami-Miho air route,** 9.2–116; **Turbulence effects on pilot balloon ascension** (Longley), 9.2–158; **Atmos. pollution research with balloons** (Lucas et al.), 9.2–159; **Airplane observation of turbulence spectra** (Notess, Eakin), 9.2–161; **Correlation of atmos. sounding data and turbulence** (Mason, Gardner), 9.2–162; **Wind profiles and shear stress** (Deacon), 9.2–189; **Atmos. diffusion of smoke puffs** (Gifford), 9.2–191.

9.2–212 551.551:551.513.2:551.557

Scorer, R. S., **Clear air turbulence in the jet stream.** *Weather*, 12(9):275–282, Sept. **1957.** 6 figs., 4 refs. **DWB**—A simple account of jet streams reprinted from **The Aeroplane.** A front or frontal zone could produce a thermal wind of 90±40 kn at 30,000 ft. Above the tropopause conditions are reversed. When the frontal zone is intensifying ageostrophic wind towards low pressure is produced. Clear air turbulence at exit results from negative static stability or dynamic instability due to very large shear, ratio being Richardson number. When Ri is less than 0.01 turbulence is almost certain. This happens in a series of shallow layers, 1000 ft or less deep. Forecasting is difficult. *Subject Heading:* **1. Jet stream turbulence.**—*C.E.P.B.*

9.2–213 551.551.5

Edinger, James G. and Rapp, R. R., **Dispersion in the upper atmosphere.** *Journal of Meteorology*, 14(5):421–425, Oct. **1957.** 5 figs., 3 tables, 6 refs., 9 eqs. **DWB**—Four-hourly fixes of transosonde balloon flights at 300 mb for 10 days were analyzed by autocorrelation (u and v components) to find large scale dispersion. Total standard deviations by transosonde were: σ_u 49, σ_v 51, compared with 30 each from **Upper Winds over the World.** *Subject Heading:* **1. High level turbulence.**—*C.E.P.B.*

9.2–214 551.551.5:551.507.351

MacCready, P. B.; Lockhart, T. J.; Diamond, R. J. and Smith, T. B., **Atmospheric turbulence investigation by sailplane.** Meteorology Research, Inc., Pasadena, California, Contract AF 19(604)-1107, Final Report, March 31, **1956.** 47 p. 16 figs. (inc. photos), 24 refs. **DWB**—The horizontal and vertical turbulent energy in the atmosphere for various eddy sizes was studied by means of a sailplane equipped with an accelerometer, hot wire anemometer and tape recorder. The airborne and laboratory apparatus in particular, the General Radio Vibration Analyzer and Integrater are described with the aid of photographs and diagrams. Experimental data on and discussion of the horizontal turbulence energy spectrum, dissipation and total energy, vertical turbulence spectra and aircraft response, isotropy, gust loading on aircraft and transition from severe turbulence to smoothness in wave conditions are presented. In addition, the report contains a discussion of the theory of isotropic turbulence and Kolmogorov's similarity hypothesis, the turbulence decay law and of vertical vs. horizontal turbulence and a simplified method of obtaining power spectra from correlation coefficients. *Subject Headings:* **1. Sailplane turbulence observations. 2. Turbulence spectrum 3. Isotropic turbulence 4. Kolmogorov's similarity hypothesis.**—*I.L.D.*

WIND DISTRIBUTION AND VARIATIONS

See also: **Winds and weather, Antarctica** (Lamb), 9.2–59.

9.2–215 551.552(42)

Spurr, G., **The frequency of light winds in the English Channel.** *Royal Meteorological Society, Quarterly Journal*, 83(358):549–552, Oct. **1957.** 6 tables, 2 refs. **DWB**—Possibility of breakdown of connection of electricity systems of Britain and France led to a statistical analysis of frequency of light winds in each month in Dover Straits. Tables give percentage of time and number of days wind blows at given Beaufort force, number of days of wind equal to or less than 10 kt and 6 kt, number of runs of 2 or more days with 6 kt or less and probability of not less than 7 days in each month with 10 kt or less. *Subject Headings:* **1. Wind frequencies 2. Dover, Eng.**—*C.E.P.B.*

9.2–216 551.553.1:551.543.1(729.9)

Bartrum, P. C., **The diurnal variation of surface wind and pressure at Bermuda.** *Meteorological Magazine*, London, 86(1024):296–301, Oct. **1957.** 3 figs., 3 tables, 4 refs. **DWB**—Anemometer vane 222 ft a.s.l. Winds tabulated hourly for 1935 and 1936. Diurnal variation of wind speed shows a maximum at noon and a secondary minimum at 13–14 h. Diurnal variation of vector winds shown, also harmonic analysis calculated and related to harmonic analysis of pressure. *Subject Headings:* **1. Diurnal wind variation 2. Diurnal pressure variations 3. Bermuda.**—*C.E.P.B.*

9.2–217 551.553.11(797)

Staley, Dean O., **The low-level sea breeze of northwest Washington.** *Journal of Meteorology*, 14(5):458–470, Oct. **1957.** 14 figs., 2 tables, 13 refs., 2 eqs. **DWB**—Sea breeze studies since 1944 are summarized. Resultant winds were computed for 20 stations and represented by hodographs for July and Aug. 1950. On N. Puget Sound winds fall off at night and increase to a maximum between 12.5 h and 18.5 h. The maximum westerly component is around noon, maximum easterly early night; rotation generally clockwise, less regular and less intense in Jan. Further south winds are lighter, and rotation counter-clockwise at Tacoma. The Juan de Fuca group is next discussed, then the coastal group; hodographs are less regular than for N. Puget Sound. Hodographs are then drawn for clear and cloudy days. Some resultant winds at 1000 and 2000 ft are given. The diurnal wind variations are related to diurnal variations of sea level pressure and pressure differences between pairs of stations. The applicability of existing theories, especially that of B. HAURWITZ, is discussed; Coriolis force cannot give counter-clockwise rotation. Near stagnation of daytime and nighttime points represents approaches to two equilibriums, and other points of agreement are shown. *Subject Headings:* **1. Sea breezes 2. Washington.**—*C.E.P.B.*

WIND EFFECTS

See also: **Wind utilization** (Karmishin), 9.2–21; **Wind tides** (Tickner), 9.2–92; **Hurricane wave statistics** (Gulf of Mexico), 9.2–95; **Forest shelter belts** (Smal'ko), 9.2–127; **Wind utilization, Hungary** (Kakas, Mezősi), 9.2–137; **Wind utilization, Hungary** (Golding), 9.2–138; **Orographic clouds** (Coutts), 9.2–231.

9.2–218 551.556:551.311.3

Chepil, W. S., **Sedimentary characteristics of dust storms, Pt. 1, Sorting of wind-eroded soil material.** *American Journal of Science*, New Haven, Conn., 255(1):12–22, Jan. **1957.** 3 figs., 4 tables, 12 refs. Also: Chepil, W. S. and Woodruff, N. P., **Pt. 2, Visibility and dust concentration.** *Ibid.*, 255(2):104–114, Feb. **1957.** 3 figs., table, 5 refs., 10 eqs. Also: Chepil, W. S., **Pt. 3, Composition of suspended dirt.** *Ibid.*, 255(3):206–213, March **1957.** 2 figs., 4 tables, 9 refs. **DWB**—In Pt. 1: it is stated that sorting of soil materials by the wind is an intricate phenomenon. The most distinct feature in the whole sorting process was found to be the peak diameter of the saltating grains. Fractions larger than the peak diameter tend to remain in the wind-eroded fields, and particles smaller than this diameter tend to be deflated and carried far through the atmosphere. Depending on soil class, from 31 to 78 percent of particles smaller than 0.1 mm in diameter contained in the wind-transported soil fraction are deflated by a single windstorm. Silt generally is more readily deflated than sand or clay. Wind erosion has caused little damage in texture of loess soils but has tended to remove the fine constituents from the coarser-textured soils, leaving the sand behind. This sorting process if continued even for a day or two adds considerable to the general sandiness of the affected areas and to consequent irreparable depletion of soil productivity. In Pt. 2, analysis of some dust storms in Kansas and Colorado during 1954 and 1955 indicates a relationship between visibility and atmospheric dust concentration when rules of HOUGHTON are followed. Visibility varies inversely as some power of concentration, and concentration varies inversely as a certain power of height. The quantity of soil removed from any region for any storm or period of time can be estimated. Pt. 3 deals with studies made during dust storms in Kansas in 1954 and 1955. These studies showed that at heights between 2 and 20 ft above the ground wind-blown dust varied widely in its composition depending on the composition

of eroded soil, the year of measurement, and the distance and height of transport. The composition of the dust was like the composition of many samples of loess. The size distribution of dust and of coarser materials transported at any height or deposited anywhere after any single windstorm was characterized by a single peak diameter of the discrete particles and arms on each side of the peak falling off independently of each other at some constant rate. The peak diameter varied from one graded material to another, depending on the physical nature of the soil, distance and height of transport, and possibly the velocity of the wind. *Subject Headings:* **1. Wind sorting of soil particles 2. Wind erosion 3. Dust storms 4. Kansas.**—*Authors' abstracts & M.R.*

9.2–219 551.556.8:532.59

Phillips, O. M., **On the generation of waves by turbulent wind.** *Journal of Fluid Mechanics*, London, 2(5):417–445, July **1957.** 6 figs., 18 refs., eqs. **DLC**—Equations are developed for generation of waves on a water surface by a random distribution of normal pressure associated with the onset of a turbulent wind. Waves develop most rapidly by resonance when a component of surface pressure moves at the same speed as the free surface wave with the same wave number. Development is considered in two stages, most of the growth of gravity waves occurring in the second stage. *Subject Headings:* **1. Wave mechanics 2. Turbulence effects.**—*C.E.P.B.*

UPPER AIR WINDS

See also: **Upper air wind** (Murgatroyd), 9.2–27; **Upper air winds, Antarctica** (Robin), 9.2–60; **Upper air wind measurement** (Anderson), 9.2–142; **Deviation of contour heights and vector deviation of wind** (Thompson), 9.2–143; **Upper air wind data** (Farkas), 9.2–148; **Upper air wind data, Hong Kong,** 9.2–149, 9.2–150; **Jet stream turbulence** (Scorer), 9.2–212.

9.2–220 551.557.31:551.511.6

Buajitti, K. and Blackadar, A. K., **Theoretical studies of diurnal wind-structure variations in the planetary boundary layer.** *Royal Meteorological Society, Quarterly Journal*, 83(358):486–500, Oct. **1957.** 10 figs., 2 tables, 14 refs., 22 eqs. **DWB**—Six-hourly pilot balloon ascents at Wichita, Kansas, on 29 days in summer 1951 are plotted by levels as differences from 7000 ft to find what distribution of eddy viscosity by time and height best accounts for them. The periodic part of wind variation is an ellipse with major axis along wind vector; the maximum amplitude at 2500 ft above ground is too large to be due to gravity drainage or thermal gradients. The cause is sought by finding what periodic variations would occur a) when eddy viscosity is periodic in time and constant in height, b) by electronic computer when it varies with height. None of the experiments gave a satisfactory explanation but best agreement occurs when eddy viscosity and amplitude of variation decrease rapidly above surface layers. *Subject Headings:* **1. Eddy viscosity 2. Vertical distribution of eddy viscosity 3. Wichita, Kans.**—*C.E.P.B.*

9.2–221 551.557.36

*Cooperative Research Foundation, San Francisco, **Vertical correlations of wind components.** Contract AF 19(604)-2060, Scientific Report, No. 1, March 29, **1957.** 7 p. eqs. numerous tables. **DWB** (M58 6778s)—Tables of the means, standard deviations, and correlations of the components (North-South and East-West) of the wind at various levels over seven places from the westernmost Aleutians to Wiesbaden, Germany, including Great Falls, Mont.; Patrick AFB, Fla.; Washington, D. C.; Thule, Greenland, and Forbes AFB, Kans., are presented. The correlations are (1) between the two components at each level and (2) between the same component at different levels, from the surface to 26 km by 2-km intervals, with 1 km as well. The reliability of the individual entries is examined, and approximate confidence intervals for them are developed. *Subject Headings:* **1. Wind components 2. Vertical wind correlations. I. Court, Arnold.**—*Author's abstract.*

VERTICAL MOTION

See also: **Vertical motion** (Bodolai), 9.2–187; **Turbulent convection** (Thomas, Townsend), 9.2–192.

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY

See also: **Atmos. phenomena** (Zamorskiĭ), 9.2–22; **Cargo protection** (Shellard), 9.2–83.

9.2–222 551.571:551.511.33:551.577.38

§Budyko, M. I., **Klimaticheskie uslovia uvlazhneniia.** [Climatic factors governing humidity.] (In: Budyko, M. I. (*ed.*), **A. I. Voeĭkov i sovremennye problemy klimatologii.** Leningrad, **1956.** p. 28–44. 7 figs., table, 45 refs.) **DWB**—The work on the problem of the climatic conditions governing the moisture available to the continents from the time of Voeĭkov to the present both in Russia and outside of Russia is reviewed briefly. This is followed by a theoretical analysis of the physical laws underlying the climatic conditions of the humidity of the earth's surface based upon the physical processes of moisture and heat exchange on the earth's surface in particular upon the application of the data of heat balance. The equations for the calculation of evaporation, runoff and effective moisture are presented and their theoretical significance and use are discussed. A map showing the distribution of the radiational index of aridity and graphs showing the annual variation of the index-humidity in Gorki, Rome, Bombay; the relationship between relative humidity of the soil and radiational index of aridity and the relation between the salinity of water with that between evaporation and precipitation, and data on the water balance of the oceans are presented. *Subject Headings:* **1. Humidity 2. Heat balance 3. Aridity index 4. Climatic effects.**—*I.L.D.*

EVAPORATION AND EVAPOTRANSPIRATION

See also: **Evaporation calculation** (Bernard), 9.2–28; **Drought intensity and irrigation needs for cotton** (Holcomb, Wiegmann), 9.2–123.

9.2–223 551.573:628.1

Grundy, F., **The use of cetyl alcohol to reduce reservoir evaporation.** *Institution of Water Engineers, London, Journal,* 11(5):429–437, Aug. **1957.** 5 figs., 5 refs. **DWB**—Commercial cetyl alcohol dissolved in kerosene forms a mono-molecular layer 1/10,000,000 cm thick on a water surface. Maximum reduction of evaporation 60–70%. Small waves are damped but long periods of disturbance by wind result in deterioration of the film. Trials made in Tanganyika indicate that method should be successful on reservoirs up to about 100 acres in area. *Subject Headings:* **1. Evaporation from reservoirs 2. Cetyl alcohol.**—*C.E.P.B.*

CONDENSATION

See also: **Condensation nuclei symposia** (Dessens), 9.2–68; **London cloud physics conference** (Dessens), 9.2–70; **Icing of aircraft** (Perkins et al.), 9.2–114; **Icing of aircraft** (Fraser), 9.2–115; **Air-borne instruments for cloud physics research** (Newton), 9.2–119; **Photoelectric nuclei counters** (Nolan), 9.2–168; **Elec. conductivity of condensation nuclei** (Vidal Llenas), 9.2–268.

9.2–224 551.574.1

Dessens, H., **Le problème de la fragmentation des noyaux salins par desiccation.** [The problem of fragmentation of saline nuclei by desiccation.] *Puy de Dôme. Observatoire, Bulletin, Sér. 2,* No. 1:17–20, Jan./March **1956.** 2 figs. **DWB**—A resume of work done in France on the nature of fragmentation of saline nuclei during drying-out, presented as additional remarks to the paper of Lodge and Baer (*J. of Met.,* 11:420-1, 1954; *see* 6.3–233, March 1955, *MAB*) who tried to resolve this problem without knowledge of earlier French work. Work by Pacaud, H. (1949), Facy (1951) and the author are emphasized, and microphotography and quantitative results presented. *Subject Headings:* **1. Saline nuclei fragmentation. I. Lodge, J. P. II. Baer, F.**—*M.R.*

9.2–225 551.574.1

Dessens, H., **Les noyaux de condensation météorologiques en Afrique Équatoriale.** [Meteorological condensation-nuclei in equatorial Africa.] *Geofisica Pura e Applicata,* Milan,

36:167–168, Jan./April **1957.** fig. **DLC**—French and English summaries, p. 167. Qualitative and quantitative studies of condensation nuclei $>0.10\mu$ were made at Lukolela (17°E, 1°S) in the Congo in July 1955 and 1956 with a cascade impactor. It was found that giant hygroscopic nuclei ($>5\mu$) were always present in the Central African Equatorial Forest, and were about as abundant as were those found by FOURNIER D'ALBE at Lahore, Pakistan and Peshawar. It is thought that these giant nuclei are not of marine origin, but arise from brush fires. The concentration of particles of different radius on July 23, 1955 at 10 h at Lukolela was:

radius, μ	6	8	10	12	14	16	18	20	≥ 22
N/M^3	1300	660	65	27	11	4	2	2	0–3.

Subject Headings: **1. Giant nuclei 2. Atmospheric nuclei concentration data 3. Lukolela, Belgian Congo.**—*M.R.*

9.2–226 551.574.11

Mason, B. J. and Ghosh, D. K., **The formation of large droplets in small cumulus.** *Royal Meteorological Society, Quarterly Journal*, 83(358):501–507, Oct. **1957.** 2 figs., 11 refs., 18 eqs. **DWB**—Droplets of radius $>30\mu$ are sometimes present in concentrations of 100/litre, and of 50μ in 1/l, in cu <5000 ft deep and liquid water content of only 0.5 g/m³. Droplet growth is first considered on condensation nuclei lifted from cloud base along a saturated adiabatic. Solutions are found which are accurate after about 200 sec. Growth of rare giant nuclei is also calculated. It is shown that a cloud $1\frac{1}{2}$ km deep lasting for an hour may produce droplets of $30–50\mu$, formed by growth on nuclei of mass about 10^{-10} g, such as occur over oceans, southern England and other areas close to the sea. *Subject Headings:* **1. Droplet formation 2. Giant nuclei.**—*C.E.P.B.*

9.2–227 551.574.1:551.508.91

Murgatroyd, R. J. and Garrod, M. P., **Some recent airborne measurements of freezing nuclei over southern England.** *Royal Meteorological Society, Quarterly Journal*, 83(358):528–533, Oct. **1957.** 4 figs., table, 5 refs. **DWB**—Daily aircraft ascents over southern England on 25 days in Jan. 1956 did not show maxima of freezing nuclei on dates expected from E. G. BOWEN's theory of fall of meteoric particles into troposphere. The decrease of condensation nuclei with height suggests that they are mainly produced at earth's surface. This does not hold for freezing nuclei, which give higher temperatures of complete glaciation above inversions. *Subject Headings:* **1. Freezing nuclei 2. England. I. Bowen, E. G.**—*C.E.P.B.*

9.2–228 551.574.1

Schotland, R. M., **The collision efficiency of cloud drops of equal size.** *Journal of Meteorology*, 14(5):381–385, Oct. **1957.** 6 figs., 3 refs., 12 eqs. **DWB**—Collision between drops of equal size can be significant in early stages of cloud-drop growth. An experiment was designed to test collisions between drops of equal size in diameter range $11–22\mu$. "It was found that such drops will collide with an initial vertical separation as large as 20 drop radii and an initial horizontal separation of approximately 0.3 drop radii. The approach velocity of the two drops, averaged over a vertical separation of 20 radii, is nearly constant at 0.1 of the terminal velocity of the drops. An analysis was made of the collision rate between drops of equal size under the assumption that the drops are located randomly in space. It is shown that the collision rate is proportional to the square of the ratio of cloud liquid-water content to drop size." *Subject Heading:* **1. Cloud droplet collision.**—*Mainly author's abstract.*

CLOUDS

See also: **Condensation trails** (Appleman), 9.2–26; **Cloud effects on sky brightness** (Barr et al.), 9.2–116.

9.2–229 551.576

Baer, F. (*Univ. of Arizona, Tucson*), **The influence of illumination on cirrus reports.** *American Meteorological Society, Bulletin*, 37(7):366–367, Sept. **1956.** 2 figs., eqs. **DWB**—

A short statistical study was made at the Institute for Atmospheric Physics, using Tucson Weather Bureau 3-hourly cirrus cloud observations for Jan. to June 1946–54, to determine whether the night observations of cirrus were consistent with daytime observations. Frequency of cirrus are related to the lunar day and found to fall off markedly during the waning moon and to increase gradually during the waxing phase. Also the diurnal frequency falls off much more rapidly after sunset during new moon than during full moon. Finally there is no really significant diurnal variation in cirrus if illumination is taken into consideration. *Subject Headings:* **1. Nighttime cirrus observations 2. Diurnal cirrus variations 3. Lunar effects on cirrus 4. Tucson, Arizona.**—*M.R.*

9.2–230 551.576.1

Bateman, J. W., **Abominable cloudman.** *Weather*, 12(11):361, Nov. **1957.** photo. **DWB**—Photo of CiCu at Teddington, Surrey, July 3, 1957, 8 p.m. showed 3 round holes. Cause unknown. *Subject Heading:* **1. Cloud formation.**—*C.E.P.B.*

9.2–231 551.576.1:551.556.21(676)

Coutts, H. H., **Unusual orographic cloud formation.** *Weather*, 12(10):320–322, Oct. **1957.** 6 figs. **DWB**—Description of orographic cloud with vertical structure round summit of Mt. Meru, nearly 15,000 ft, in Tanganyika. *Subject Headings:* **1. Orographic clouds 2. Mt. Meru, Tanganyika.**—*C.E.P.B.*

PRECIPITATION

See also: **Drought intensity and irrigation needs for cotton** (Holcombe, Wiegmann), 9.2–123; **Radar analysis of precip.** (Boucher), 9.2–144; **Radar analysis of rain,** 9.2–145; **Meteor influences on precip.** (Bowen), 9.2–180.

9.2–232 551.577:551.501

†Brooks, Charles F., **Need for universal standards for measuring precipitation, snowfall and snowcover.** *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Bulletin*, No. 23:(1928?). Reprint of 53 p. 16 figs., 2 tables. Annotated bibliography, p. 37–52. **DWB**—Problems of precip. measurement: Choosing a representative site in relation to topography, obstructions on roofs, changes in site, wind shields, height above ground, gage characteristics, loss by evaporation or leakage, recording; and of measuring snowfall: recorders, water equivalent, weighing, sleet and glaze totalizers, snow and ice on ground, etc. are discussed and illustrated in a systematic manner and supported by an extensive bibliography (arranged alphabetically by author). *Subject Headings:* **1. Precipitation measurement 2. Rain and snow gage problems.**—*M.R.*

9.2–233 551.577.21(41/2):551.577.36

Gregory, S., **Annual rainfall probability maps of the British Isles.** *Royal Meteorological Society, Quarterly Journal*, 83(358):543–549, Oct. **1957.** 4 figs., 4 refs. **DWB**—Maps of probability of annual totals of more and less than 20, 30, 40 and 50 in. are constructed for 1901–30 and discussed. *Subject Headings:* **1. Rainfall probability 2. British Isles.**—*C.E.P.B.*

9.2–234 551.577.38:519.24

Lawrence, E. N., **Estimation of the frequency of "runs of dry days," Pt. 1.** *Meteorological Magazine*, London, 86(1023):257–269, Sept. **1957.** 6 figs., 9 tables, eqs. To be concluded. **DWB**—Sequences of days with not more than 0.1 mm rain over S. and E. England are compared with geometric, logarithmic, natural persistence and Jenkinson probability series. The natural persistence series, giving the series of runs lasting at least t days is $NP_4P_5 \ldots P_t$ (P_4 is probability that after at least 3 dry days the next day will be dry), with area values for probabilities gives the most convenient and accurate reproduction (for Pt. 2, *see* 9.2–235). *Subject Headings:* **1. Rainless spells 2. Statistical techniques.**—*C.E.P.B.*

9.2–235 551.577.38:519.24

Lawrence, E. N., **Estimation of the frequency of "runs of dry days," Pt. 2.** *Meteorological Magazine*, London, 86(1024):301–304, Oct. **1957.** fig., 6 refs. **DWB**—In this continuation

of *Met. Mag.*, 86(1023):257–269, Sept. 1957 (*see* 9.2–234), persistence is considered. In England there are several types, depending on length of run. Area probability values differ sufficiently from month to month to suggest that better frequencies could be calculated from a sliding scale of values. *Subject Headings:* **1. Persistence 2. Statistical studies.**—*C.E.P.B.*

SNOW

See also: **Avalanches** (Flaig), 9.2–17; **Hail prevention, Switzerland,** 9.2–35; **Snow cover periodicities** (Bowen), 9.2–180.

9.2–236 551.578.4

American Geophysical Union. Committee on Snow, **Report of the Committee, 1954–1955. R. A. Work, chairman.** *American Geophysical Union Transactions*, 36(6):1069–1072, Dec. **1955. DWB, DLC.**—Studies underway in Colorado, Idaho, Pennsylvania, Michigan, Montana, Utah, California, Alaska, Canada, and Greenland Ice Cap are reported by M. E. Baudendistel, V. J. Schaefer, R. D. Elliott, D. M. Rockwood, K. Butson and others. Work varies from albedo and snow density studies to effects of forest cutting (snow stays longer in cut strips than in open or in completely forested terrain) and of cloud seeding, etc. **Discussion by Louis Lliboutry.** *Ibid.*, 38(1):114–115, Feb. **1957.** fig., 5 refs., 3 eqs.—In the discussion it is stated that the albedo of snow is an important factor in formation of micro-penitents at high elevations in low latitudes, for the albedo is lowest at high solar angles, increasing the heat from insolation in the cracks and minimizing the heat absorbed on the knives. The other factors which must be measured regularly are dew point, wind speed and air temp. above the surface. *Subject Headings:* **1. Snow research reports. I. Work, R. A. II. Lliboutry, Louis.**—*M.R.*

9.2–237 551.578.41:548.5

Hosler, Charles L.; Jensen, D. C. and Goldshlak, Leon, **On the aggregation of ice crystals to form snow.** *Journal of Meteorology*, 14(5):415–420, Oct. **1957.** 3 figs., 4 tables, 15 refs. **DWB**—Small spheres of ice (radius .29 in.) were brought together in a cold chamber (0 to −80°C) and then pulled apart. Under supersaturation force required to separate spheres decreased from 333 dynes at 0°C to 1 at −25°C. In a dry environment it decreased from 333 dynes at 0°C to 1 at −3°C. A vertical wind tunnel was then construtced so that a cloud could be drawn past a single crystal between −19 and −31°C and visual observations of aggregation made. Stickings to single crystal were too numerous to count but increased with temperature —with a significant jump at −24.5°C. Sticking is not due to melting and regelation since no pressure is necessary. *Subject Headings:* **1. Ice crystal growth 2. Snow formation.**—*C.E.P.B.*

9.2–238 551.578.43(546)

*Bhan, S. N. (*Met. Obs., Srinagar*), **Snowfall at Srinagar, (1939–1953).** *Indian Journal of Meteorology and Geophysics*, 7(3):295–300, July **1956.** 8 tables. **DWB**—A nice statistical study of frequency of snowfall, depth, duration and time of day at Srinagar for the period 1939–53, arranged by days of the month or 4-hourly periods during the day. Snowfall occurs only from Oct.–March (only twice in Oct.) and is never very deep or prolonged (only 2 occasions over 5 days). *Subject Headings:* **1. Snowfall data 2. Snowfall frequencies 3. Srinagar, Kashmir.**—*M.R.*

9.2–239 551.578.45(425)

Murray, M., **Snowfall in Leicestershire 18–19 February 1957.** *Weather*, 12(10):329–330, Oct. **1957.** fig. **DWB**—Nearly 1 ft of snow fell between midnight on Feb. 18 and 10 h on Feb. 19 in Leicester and east to county border, but none to west and south. *Subject Headings:* **1. Snowstorms 2. Leicester, Eng.**—*C.E.P.B.*

9.2–240 551.578.46:551.591

Fritz, Sigmund, **The "Polar whiteout."** *Weather*, 12(11):345–349, Nov. **1957.** fig., 8 refs. **DWB**—With snow covered terrain and overcast sky in clear air crevasses and hills

cannot be detected—the "Polar Whiteout." Luminance of overcast sky from zenith to horizon is computed for different ground reflectivities R; whiteout can occur with R about 0.9, but changes with wavelength of incident light. A thermal radiation detector operating on about 10μ might enable the horizon to be distinguished, but might not work in the low humidity of polar regions. W. T. ROACH and FRITZ discuss this problem. *Subject Headings:* **1. Snow cover effects 2. Visibility of horizon 3. Polar whiteout.**—*C.E.P.B.*

9.2–241 551.578.46

Petri, Erna, **Der Einfluss der Schneedecke auf Wetter und Klima.** [The influence of the snow cover on weather and climate.] *Naturwissenschaftliche Rundschau,* 10(11):431–432, Nov. **1957.** fig. **DWB**—Snow cover is dependent on climate but also influences weather and climate. This is due to the power of new fallen snow to reflect heat, and slight heat conduction of loose snow. Above snow air is dry, clean and cold. Conditions in cold and warm air masses over snow-free and snow-covered ground are discussed. *Subject Heading:* **1. Snow cover effects.**—*C.E.P.B.*

HYDROMETEOROLOGY

See also: **Hydromet. services, Ill.** (Nelson), 9.2–64; **Soil moisture** (Druzhinin), 9.2–122.

9.2–242 551.579

*Carter, Douglas B., **The water balance of the Lake Maracaibo Basin during 1946–1953.** *Drexel Institute of Technology. Laboratory of Climatology, Publications in Climatology,* 8(3):209–227, **1955.** 6 figs., tables, 4 refs. **DWB?**—The water balance of the Lake Maracaibo Basin which lies astride the border between Venezuela and Colombia is studied by climatic means because adequate hydrologic measurements are lacking. Evaporation and precipitation over the lake and marsh areas are estimated for each month during the period 1946–53 and the runoff from the upland areas is computed by Thornthwaite's method. All elements are integrated by planimetry. Periods when precipitation onto the lake and runoff from the uplands are not sufficient to offset the evaporation from the lake result in inflow from the Gulf of Venezuela while periods having an excess of precipitation and runoff in relation to evaporation from the lake are associated with a net outflow of water to the Gulf of Venezuela and the Caribbean Sea. Actual monthly amounts of inflow or outflow are presented. Generally the greatest inflow into the lake from the Gulf of Venezuela occurs in March while the largest outflow from the lake occurs in October. *Subject Headings:* **1. Water balance of lakes 2. Hydrologic cycle 3. Lake Maracaibo, Venezuela.**—*Author's abstract.*

9.2–243 551.579.1:628.1

Balchin, W. G. V., **The nation's water supply.** *Geography,* London, 42:149–159, **1957.** fig., table, 10 refs. **DLC**—Great Britain is approaching the time when demand for water will exceed minimum supply. Six categories of water use are listed. Development of water supply is described, beginning with Hull (1447). Inland Water Survey was set up in 1935. Consumption of water increased from 772.6 million gallons a day in 1938 to 1003.4 million in 1955, and further increases are likely. There is urgent need for a Hydrological Research Board. *Subject Headings:* **1. Water supply 2. Great Britain.**—*C.E.P.B.*

9.2–244 551.579.4

***Das Hochwasser im Bayerischen Donaugebiet im Juli 1954.** [Floods in the Bavarian area of the Danube in July 1954.] *Deutsches Gewässerkundliches Jahrbuch, Besondere Mitteilungen,* No. 14, pub. Munich **1955.** 75 p. 16 charts (fold.), 6 tables, 15 refs. Contents: Kern, Helmut: **Der Hochwasserregen im Donaugebiet im Juli 1954,** p. 7–16. Völk, Joseph: **Der Ablauf der Hochwassers,** p. 17–69. Volk, Joseph: **Beziehung zwischen Niederschlag und Abfius,** p. 70–72. **DWB**—A detailed analysis of rainfall and runoff conditions in the Valley of the Danube and tributaries (Lech, Altmuhl, Naab, Isar, Iun, Alz, etc.). The first article gives a review of other studies on this flood and on previous floods in this region going back to 1899 (including floods of 1910, 1924 and 1940) and a quantitative comparison of rainfall, etc. in the July 1954 and the Sept. 1899 floods. Synoptic weather conditions as well as rainfall conditions are fully analyzed, and elaborate tables and large charts showing isohyets for

each basin presented. An analysis of relation between rainfall and runoff and flood hydrographs are included in 3rd article. *Subject Headings:* **1. Floods, Bavarian Danube (July 1954) 2. Flood-rainfall data analysis 3. Danube River.**—*M.R.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See: **Voeĭkov's contribution to climatology** (Budyko, *ed.*), 9.2–8.

CLIMATE OF PARTICULAR PLACES

See also: **Climate, U.S.S.R.** (Alisov), 9.2–9; **Climate, central European U.S.S.R.** (Gol'tsberg, Drozdov), 9.2–22; **Climate of European U.S.S.R.** (Gol'tsberg, Drozdov), 9.2–24; **Climate, Sweden,** 9.2–25; **Climate, Thuringia** (Ehwald), 9.2–32; **Climate, Cloquet Forest, Minn.** (Schantz-Hansen, Jensen), 9.2–34; **Climatic atlas, Japan** (Daigo), 9.2–39; **Climate, Missouri** (Collier), 9.2–40; **Climate, Macquarie Island** (Law, Burstall), 9.2–57; **Winds and weather, Antarctica** (Lamb), 9.2–59; **Climate, Bay of Biscay** (Gt. Brit. Hydrographic Off.), 9.2–82; **Climate, Middle Volga** (Okushko), 9.2–126.

9.2–245 551.582(468):551.589

§*Font Tullot, Inocencio, **El tiempo atmosférico en las Islas Canarias.** [Weather in the Canary Isles.] *Spain. Servicio Meteorológico Nacional, Publicaciones, Ser. A, Memorias,* No. 26, **1956.** 96 p. 38 figs., table, 21 refs. **DWB**—The synoptic climatology, the general circulation and climate of the Canaries are treated systematically, with many illustrative synoptic case histories and air flow statistics. The work is divided into 10 chapters under two major headings, *Normal* and *Disturbed* weather: I. General circulation at low levels (mean surface charts, trades, cold sea current effects, monsoons); II. The humid lower strata; III. High level circulation (600 and 500 mb, NW and SW flow); IV. Effect of relief (on trades, effect of altitude, effect on precipitation); V. Polar maritime invasions; VI. Cold lows; VII. Polar front cyclones; VIII. Waves in Easterlies; IX. Intertropical front depressions; and X. Hot African continental air invasions. General and type situations are discussed and illustrated with sections of surface and 500 mb synoptic charts from the U. S. Weather Bureau and Air Weather Service and Deutsche Wetterdienst synoptic charts series. *Subject Headings:* **1. Climate of the Canary Isles 2. Synoptic climatology of the Canary Isles 3. Canary Isles.**—*M.R.*

9.2–246 551.582(689)

*Great Britain. Meteorological Office. Investigations Division. **Northern and Southern Rhodesia, and Nyasaland.** Its *Climatological Report,* No. 94. London, **1957.** 40 p. 19 tables, 19 refs. Mimeo.—N. and S. Rhodesia are plateaus separated by Zambesi River. Data for 15 stations are given. General climate is tropical continental modified by altitude. Winter dry (April–Sept.) and summer wet (Oct.–March) seasons are described under pressure, winds, temperature and humidity, visibility, cloud, precipitation, thunderstorms, icing on aircraft and turbulence. Appendix gives notes on Nyasaland, with tables for 6 stations. *Subject Headings:* **1. Local climates 2. Rhodesia 3. Nyasaland.**—*C.E.P.B.*

9.2–247 551.582.1(261) 551.586:615.825

Zenker, H., **Unterschiede im Klima der deutschen Ostseeküste und ihre bioklimatische Bedeutung.** [Differences in the climate of the German Baltic coast and their bioclimatic importance.] *Angewandte Meteorologie,* 3(1):7–15, July **1957.** 8 figs., 3 tables, 8 refs. **DLC**—In connection with asthma in children, bioclimatic studies were made at Warnemünde and Heringsdorf, 1951–55. Wind direction (on- or off-shore) is the most important factor. Sea (west) winds are more frequent and stronger at Warnemünde, land (east) winds at Heringsdorf. Other important bioclimatic factors largely governed by wind direction are daily amplitude of air temperature and, to a less extent, cloud amount. The main climatic difference on the German Baltic coast is that on W and NW coasts marine influences and climatic stimulus are stronger than on NE and E coasts. *Subject Headings:* **1. Bioclimatology 2. Local climatology 3. German Baltic coast.**—*C.E.P.B.*

9.2–248 551.582.2(57)

*U. S. Air Force. Tokyo Weather Central, **Weather data for Southeastern Siberia, first priority area, Final report.** Prepared by the Climatology Div. March **1956.** 39 p. almost entirely tables. Carbon of typescript. **DWB** (M82.2/57 U581w)—The data presented in this report cover the periods Jan. 1950 to Dec. 1951 and Feb. 15, 1953 to Dec. 31, 1954, and have been compiled from information supplied by the Central Meteorological Observatory, Tokyo, and from Russian radio weather broadcasts. The tables include monthly, mean, mean maximum, minimum and extreme temperatures, frequency distribution (in days) of various maximum and minimum temperatures, monthly mean temperature and relative humidity, monthly mean frequency (in days) with various degrees of visibility, monthly mean frequency of cloud cover, prevailing wind direction and mean wind speed, monthly mean frequency of snowfall, of gales, of hail, etc. *Subject Headings:* **1. Climatic data 2. Climate of Southeast Siberia 3. Siberia.**—*I.L.D.*

CLIMATIC CHANGES

See also: **Climatic change, Japan** (Arakawa), 9.2–23; **Climate-crop yield correlations, Finland** (Hustich), 9.2–125.

9.2–249 551.583.15(262.4)

Karapiperis, Leon N., **Halcyon days.** *Weather*, 12(10):311–313, Oct. **1957.** 3 refs. **DWB**—In eastern Mediterranean bad weather of winter is often interrupted by calm sunny days (cloudiness <2/10, sunshine >80%). They do not occur every year; 69% occur when Azores anticyclone extends over Europe and N. Africa and specifically when a secondary high occurs over Europe. *Subject Headings:* **1. Singularities 2. Halcyon days 3. Eastern Mediterranean.**—*C.E.P.B.*

9.2–250 551.583.2 551.311.12

Böckler, W., **Die Klimaänderungen in den letzten tausend Jahren.** [The climatic changes of the last thousand years.] *Naturwissenschaftliche Rundschau*, 10(11):430–431, Nov. **1957. Alpengletscher als Zeugen für Klimaschwankungen.** [Alpine glaciers as indicators of climatic oscillations.] *Ibid.*, 431. **DWB**—The very varied evidence of climatic changes is listed and the changes in central Europe set out in detail. Causes discussed are changes of radiation, changes of heat balance of water circulation, volcanic eruptions and CO_2 (which is favored). The second paper describes glacial advances and retreats since 1000 B.C., mainly in Europe. *Subject Headings:* **1. Historical climates 2. Glacier variations 3. Europe.**—*C.E.P.B.*

9.2–251 551.583.2

Borisov, A. A., **O kolebaniiakh klimata Kryma za istoricheskoe vremia.** [Climatic oscillations in Crimea during historical times.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Leningrad, Izvestiia*, 88(6):532–541, Nov./Dec. **1956.** 2 figs., 9 refs. **DLC**—The history of the climate of Crimea during the past 2500 years is summarized on the basis of historical, literary, and where possible, quantitative data especially in so far as meteorological data are available. Data on monthly minimum air temperatures in the Crimea, a chart showing synoptic conditions of extreme, graphs showing the variation of mean annal air temperature for the period 1881–1950. Ten-year smoothed temperature and rainfall data for Yalta and annual variation of air for given secular periods and a diagram showing the varieties of the climate of Crimea during historic time are presented. During the past 2000–2500 years the climate of Crimea has not undergone any substantial changes, but climate oscillations of ten year durations of either warming or cooling have occurred during the period. *Subject Headings:* **1. Historical climates 2. Crimea.**—*I.L.D.*

9.2–252 551.583.3

Clisby, Kathryn H. (*Oberlin College, Oberlin, Ohio*) and Sears, Paul B. (*Yale Univ., New Haven, Conn.*), **San Augustin Plains: pleistocene climatic changes.** *Science*, Wash., D. C., 124(3221):537–539, Sept. 21, **1956.** fig., 4 refs. **DLC**—Also, **Old pollens date ice age climates.**

Science News Letter, Wash., D. C., 70(14):213, Oct. 6, **1956.** **DLC**—Pollen analyses of cores from a dry lake bed in New Mexico (subalpine spruce) combined with radiocarbon dating, show the periods of low temperature (assumed to be glacial periods) and intervening milder periods for many thousands of years. One glacial period was around 19,700 yrs ago and another about 27,000 yrs ago. These are at the 19 and 28 ft level, but the record goes down to 300 ft (as shown on profile) and the cores to 645 ft. The San Augustin Plains lie at about 7000 ft elev. *Subject Headings:* **1. Pollen analysis 2. Pleistocene climates 3. Climatic changes 4. San Augustin Plains, N. Mex.**—*M.R.*

9.2–253 551.583.3:551.311.3:631.4(47)

Haase, Günter and Richter, Hans, **Fossile Böden im Loss an der Schwartzmeerküste bei Constanta.** [Fossil soils in loess on the Black Sea coast near Constanta.] *Petermanns Geographische Mitteilungen*, Gotha, 101(3):161–173, **1957.** 5 figs., 23 refs. **DLC**—Most of the steep coast is 20 m or more of loess, divided into 3 or 4 layers by loam horizons, two of fossil red loam. Different morphological types are described. A complete vertical profile north of Constanta is given and interpreted in terms of climatic changes during Würm period. There were large abrupt changes of humidity and lesser but parallel changes of temperature. Bearing on climatic changes in Europe is discussed. *Subject Readings:* **1. Climatic changes 2. Loess 3. Russia.**—*C.E.P.B.*

9.2–254 551.583.3:551.521.13

Simpson, George C., **Further studies in world climate.** *Royal Meteorological Society, Quarterly Journal*, 83(358):459–485, Oct. **1957.** 6 figs., 2 tables, 13 refs., disc. p. 481–485. **DWB**—Recent work has shown 4 pluvials in Africa instead of 2. The theory that increased solar radiation leads to ice ages is briefly explained and effects on terrestrial radiation, temperature and precipitation are discussed. The conditions during glacial and interglacial phases are set out theoretically in terms of solar radiation. Three oscillations of solar radiation gave 4 glaciations, separated by warm wet and a cold dry interglacial, the pluvial periods extending over the warm wet interglacials. The glacial phases come near beginning and end of pluvials. The relation is elaborated. In the appendix some numerical values of temperature in different latitudes are assigned. *Subject Headings:* **1. Glacial periods 2. Pluvial periods 3. Quaternary climates.**—*C.E.P.B.*

9.2–255 551.583.3:581.16

Vostriakov, A. V.; Mizinov, I. V.; Moskvitin, A. I. and Chiguriaeva, A. A., **Klimaticheskie usloviia Akchagyla po novym litologicheskim i mikropaleobotanicheskim issledovaniiam v iuzhnom Zavolzh'e.** [Climatic conditions of Akchagyl according to new lithological and micropaleobotanical investigations in southern Zavolzh'e.] *Akademiia Nauk SSSR, Doklady*, 105(1):144–146, Nov. 1, **1955.** 14 refs. **DLC**—Evidence is summarized indicating that the level of the Akchagyl Sea underwent a temporary lowering and partial freshening. Pollen studies indicate that the marine Akchagyl strata in central Povolzha were deposited during a temperate climate. The pollen analysis of the overlying taiga horizon is described, the relationship of this horizon to the first glaciation of the Russian plain and of the Akchagyl age to this glaciation and the climatic sequences as indicated by pollen analyses are discussed. *Subject Headings:* **1. Pollen analysis 2. Glaciation 3. Trans-Volga, U.S.S.R.**—*I.L.D.*

MICROCLIMATOLOGY

See also: **Forest microclimates** (Shirley), 9.2–129.

9.2–256 551.584.4

Müller-Stoll, W. R. and Freitag, H., **Beiträge zur bestandesklimatischen Analyse von Wiesengesellschaften (Untersuchungen im Ober-Spreewald).** [Contribution to the climatic analysis of meadow associations (Investigations in Upper Spree Forest).] *Angewandte Meteorologie*, 3(1):16–30, July **1957.** 6 figs., table, 15 refs. **DLC**—On the basis of temperature and evaporation measurements on fine midsummer days a summary is given of the bioclimatic conditions of some plant associations of the Upper Spree forest. Depending on the height and density of the stands as well as the structural peculiarities of the plant species a more or

less developed stand climate develops, which shows a greater individuality the further the active surface is from the radiation reversal at the ground. The individual stand climates take the succession: bristly turf—reed grass meadow—slender rush reeds. *Subject Heading:* **1. Field microclimatology.**—*Trans. of authors' abstract.*

CLIMATIC CLASSIFICATION

See also: **Arid zone research** (Mexico), 9.2–4.

9.2–257 551.585

Konček, Mikuláš, **Kritériá pre vymedzenie prirodzených klimatických oblastí.** [Criteria for determining natural climatic regions.] *Geografický Časopis*, Bratislava, 8(2/3):107–112, **1956.** eqs. Russian and German summaries p. 111–112. **DLC**—Preliminary results of the work of a commission charged with classifying climatic regions in Czechoslovakia are reported (the commission was established in 1953). Several elements were examined as to their usefulness as criteria for climatic classification. At present the commission has adopted five of these elements, namely the number of summer days, cumulative temperature, precipitation and sunshine during the growing season, and moisture index according to Konček. The last named value has been found to have an almost perfect linear relationship with Thornthwaite's moisture index, and to be three times as sensitive. *Subject Headings:* **1. Climatic regions 2. Climatic classifications 3. Czechoslovakia.**—*G.T.*

BIOCLIMATOLOGY

See: **Air conditioning engineers atlas,** 9.2–38; **Climatic effects on winter wheat, Middle Volga** (Okushko), 9.2–126; **Bioclimatic studies, German Baltic coast** (Zenker), 9.2–247.

9.2–258 551.586:551.521.16

†Lippert, E., **Probleme der biologischen Wirkung des Lichtes.** [Problems of the biological effect of light.] *Angewandte Meteorologie*, Berlin, 3(1):1–7, July **1957.** 53 refs. **DLC**—Light or brightness is a biological stimulus which varies with wavelength, as has been shown experimentally in plants, animals and men. The hygienic minimum is 10 lux, for continuous work 50 lux. Daylight in the open is 10,000 lux. The periodic alternation of light and darkness is especially important for the nervous system. Brightness is a form of energy which releases oscillations of relaxation in the organism, disturbances of which lead to pathological reactions. Few investigations have been made into animals with disturbed functions. *Subject Heading:* **1. Bioclimatology of light.**—*C.E.P.B.*

UPPER AIR CLIMATOLOGY

See: **Upper air climatology** (Martin), 9.2–41; **Weather along the Itami-Miho air route,** 9.2–116.

DYNAMIC AND SYNOPTIC CLIMATOLOGY

See: **Concepts of dynamic climatology** (Pedelaborde), 9.2–12; **Synoptic climatology, Canary Isles** (Font Tullot), 9.2–245.

MISCELLANEOUS

SOLAR INFLUENCES

See also: **Solar effects on E layer** (Beynon, Brown), 9.2–184.

9.2–259 523.74:551.590.21

Kopecký, Miloslav (*Astron. Inst., Ondřejov*), **Charakteristiky geoaktivnosti sluneční činnosti.** [Terrestrially significant solar activity.] *Meteorologické Zprávy*, Prague, 10(2):52–55, **1957.** 3 figs., 3 tables, 12 refs., 2 eqs. **DWB**—Relative sunspot number is a convenient

but not necessarily the most significant criterion of solar terrestrial effects. Two other possible parameters of long-range solar effects (mean sunspot intensity and total eruptive activity) are discussed and values of their components are tabulated for periods of varying length since 1875. Possible parameters of short-range solar effects are also discussed. *Subject Headings:* **1. Sunspot numbers 2. Solar-terrestrial relationships.**—*G.T.*

VISIBILITY

See also: **Polar whiteout** (Fritz), 9.2–240.

9.2–260 551.591.3(427)

Reynolds, G., **Variations in visibility over urban and rural areas.** *Weather*, 12(10):314–320, Oct. **1957.** 7 figs., 4 tables, 2 refs. **DWB**—Bidston Observatory is built up on E side and has open country on W. Visibility is estimated landward and seaward at 9, 12, 15 and 18 h. Observations Jan. 1954 through Dec. 1956 are analyzed. Visibility improves seaward and with increasing wind speed. *Subject Headings:* **1. Horizontal visibility variations 2. Bidston, Liverpool, Eng.**—*C.E.P.B.*

OPTICAL PHENOMENA

See also: **Cloud effects on sky brightness** (Barr et al.), 9.2–118.

9.2–261 551.593.1

Abnormal refraction [in] Gulf of Aden [and] River St. Lawrence [and] South China Sea. *Marine Observer*, 27(178):210–211, Oct. **1957.** 3 figs. **DLC**—G. of Aden, Oct. 23, 1956, moon took weird shapes at moonrise. St. Lawrence, Nov. 14, 1956, pronounced and varied abnormal refraction. S. China Sea Oct. 2, 1956, horizon displaced upward resembling an island. *Subject Heading:* **1. Refraction phenomena.**—*C.E.P.B.*

9.2–262 551.593.5 535.3:517.3

Malkevich, M. S., **O reshenii integral'nykh uravenenii teorii rasseianiia sveta v atmosfere.** [Solution of integral equations of the theory of light scattering in the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofizi.*, No. 9:1080–1090, **1956.** 4 tables, 5 refs., 25 eqs. **DLC**—The method of solving integral equations consisting of the approximation of the nuclei of elementary transcendental functions is applied to problems of light scattering in the atmosphere. The case of spherical scattering coefficient in a purely diffuse atmosphere is examined. The frequent case of anisotropic scattering is presented. It is shown how to apply physical methods to problems in which variation of the optical properties of the medium with height is taken into account. *Subject Headings:* **1. Scattering theory 2. Integral equations.** —*Trans. of author's abstract, and I.L.D.*

9.2–263 551.593.51

Cheshko, F. F. and Tabadze, N. Sh., **Zelenyĭ luch nad susheĭ.** [Green flash over land.] *Priroda*, Moscow, 45(4):113, April **1956. DLC**—The green flash was observed on Aug. 18, 1955 near Kharkov. It appeared against an orange-red background in an almost cloudless sky. It had a light bluish shadow and its width was equal to that of the solar disk. *Subject Headings:* **1. Green flash 2. Kharkov, U.S.S.R.**—*I.L.D.*

9.2–264 551.593.62

Rainbows over South Atlantic Ocean [and] Lunar rainbow over South Pacific Ocean. *Marine Observer*, 27(178):210, Oct. **1957.** fig. **DLC**—On Oct. 22, 1956, rainbows with abnormal coloring and supernumerary white rainbows. Oct. 17, 1956, lunar rainbow and secondary bow. *Subject Heading:* **1. Rainbows.**—*C.E.P.B.*

ELECTRICAL PHENOMENA

See also: **Atmos. electricity** (Mühleisen), 9.2–31; **Artificial ionization** (Kornblueh, Griffin), 9.2–141; **Radiosonde electrical conductivity soundings** (Venkiteshivaran et al.), 9.2–152; **Elec. charges inside hydrogen balloons** (Masson, Salvador), 9.2–160; **Thunderstorm electrification theories** (Wormell), 9.2–201.

9.2–265 551.594.12:551.594.22:061.3

Garton, W. R. S. and Latham, R., **Ionization phenomena in gases.** *Nature*, London, 180(4590):790–794, Oct. 19, **1957.** 2 refs. **DWB**—Account of Third International Conference on Ionization Phenomena in Gases, Venice, June 11–15, 1957. Among the 130 odd papers are two of interest: Nieek, J. M.: **Recent researches in spark breakdown** and Norinder, H.: **Some new results on the mechanism of lightning discharges.** *Subject Headings:* **1. Ionization phenomena 2. Lightning 3. Conferences.**—*C.E.P.B.*

9.2–266 551.594.13:551.515.4:551.510.535

Stergis, C. G.; Rein, G. C. and Kangas, T., **Electric field measurements above thunderstorms.** *Journal of Atmospheric and Terrestrial Physics*, 11(2):83–90, **1957.** 7 figs., table, 6 refs. **DWB**—The electric field and conductivity of the atmosphere were measured above thunderstorms in the central Florida area in a series of twenty-five balloon flights made at altitudes ranging from 70,000 to 90,000 ft above sea level. These tests indicate that at these altitudes and for the storms investigated there is a positive current of approximately 1.3 A, on the average, flowing upward from the top of the thunderstorm toward the ionosphere and confirm WILSON's hypothesis that thunderstorms are the generators which supply the electric current necessary for maintaining the earth's negative charge. *Subject Headings:* **1. Ionospheric currents 2. Thunderstorms.**—*Authors' abstract.*

9.2–267 551.594.13:551.510.535

Stergis, C. G.; Rein, G. C. and Kangas, T., **Electric field measurements in the stratosphere.** *Journal of Atmospheric and Terrestrial Physics*, 11(2):77–82, **1957.** 7 figs., 9 refs., 3 eqs. **DWB**—According to theory thunderstorms send a positive current to the ionosphere. In fair weather positive current flows from ionosphere to earth. An experimental method of measuring conductivity and electric field in stratosphere is described. Flights were made during summer afternoons 1955 and 1956 at Cape Canaveral, Florida. A sharp decrease in electric field occurs at 4000 m; above this in fair weather the electric field decreases monotonically up to 100,000 ft. Measured values agree well with calculated, assuming a constant air-earth current density. *Subject Heading:* **1. Ionospheric conductivity.**—*C.E.P.B.*

9.2–268 551.594.13:551.574.1

*Vidal Llenas, José Maria, **Contribución al estudio de la conductibilidad eléctrica del aire y de los nucleos de condensación.** [Electrical conductivity of the air and condensation nuclei.] *Revista de Geofísica*, Madrid, 15(60):441–447, Oct./Dec. **1956.** 4 figs., table, foot-ref. French and English summaries p. 441. **DWB**—Atmospheric electric conductivity and condensation nucleus content were measured in Madrid (1945–1947) and Granada (1948–1949). Results of the measurements are presented in tables and graphs showing average seasonal and annual values of conductivity (λ), ratio of positive and negative conductivity (q) and nucleus content (Z); curves representing correlations of visibility, wind speed and relative humidity with λ, q and Z; and curves of correlation between conductivity and nucleus content. All data are presented for Madrid and for Granada separately. For equal nucleus contents Madrid is found to have higher conductivity than Granada. *Subject Headings:* **1. Electrical conductivity of air 2. Condensation nuclei 3. Granada, Spain 4. Madrid, Spain.**—*G.T.*

9.2–269 551.594.21

Alpert, Leo, [**Comments on**] **Ross Gunn: Initial electrification processes in thunderstorms** (*see* 7.8–266, Aug. 1956, *MAB*). *Journal of Meteorology*, 14(5):474–475, Oct. **1957.** fig. **DWB**—Describes "rumbles" of thunder from a cumulo-congestus cloud in Guatemala City on July 21, 1956. *Subject Heading:* **1. Thunderstorm electrification.**—*C.E.P.B.*

9.2–270 551.594.21

New Mexico Institute of Mining and Technology. Research and Development Div., **Thunderstorm electricity.** Contract DA-36-039 SC-71145, Project DA-3-99-07-022, Report No. 4; Quarterly Report, Oct. 15, **1956**–Jan. 15, **1957,** Jan. 15, **1957.** 36 p. 22 figs., 7 refs. Also **Report No. 5;** Quarterly Report, period ending April 15, **1957,** April 15, **1957.** 10 p. tables, 2 refs. both, **DWB** (M94.21 N532ta)—In Report No. 4, some results of a study of the photographic and electrical records of lightning are presented and discussed. Values found for the velocities and durations of leader- and return-stroke elements from New Mexico thunderstorms are in good agreement with those measured in other areas of the world. Several records of cloud strokes from a "marginal" thunderstorm are presented and discussed. These demonstrate the presence of a fine structure which has not been reported previously. In Report No. 5, plans are presented for the forthcoming summer field program, which will be concerned with the fine structure of lightning discharges. Modification, construction, and disposition of equipment are discussed. A partial revision of the 1956 lightning stroke data is presented and discussed. An interesting, though rare, lightning discharge, which lowers positive charge to earth, is noted. It is characterized by a leader element followed by a single return stroke element of very large amplitude, and appears to occur in the very last stages of the thunderstorm. *Subject Headings:* **1. Thunderstorm electricity 2. Lightning 3. New Mexico. I. Brook, Marx.**—*Author's abstract.*

9.2–271 551.594.21

Reynolds, S. E.; Brook, M. and Gourley, Mary Foulks, **Thunderstorm charge separation.** *Journal of Meteorology,* 14(5):426–436, Oct. **1957.** 8 figs., 23 refs. **DWB**—A description of the known physical properties of a thunderstorm reveals that active charge separation occurs during that stage of the storm's life-cycle in which the growth of graupel by the accretion of supercooled droplets is the dominant process. Laboratory experiments under simulated thunderstorm conditions show that a graupel pellet, growing by the accretion of supercooled droplets, acquires negative charge as a result of collisions with ice crystals. Other experiments show that when two ice formations are placed in rubbing contact, the ice which is warmer, or which contains trace amounts of contaminants, acquires negative charge. Further experiments suggest that the charge separation results from potential differences which arise during the resolidification of a liquid layer formed at the ice-ice contact. Calculations indicate that the graupel pellets in a thunderstorm, as a result of the acquisition of the latent heat of supercooled droplets, will achieve temperatures several degrees warmer than coexisting ice crystals. Thus the graupel pellets will acquire negative charge as a result of rubbing contacts with ice crystals. The graupel pellets have much higher fall velocities than ice crystals, thus accounting for the polarity of the main thunderstorm dipole. Measurements suggest that the amount of charge separated per graupel-crystal collision is adequate to account for the magnitude of the charges of the main dipole. *Subject Heading:* **1. Thunderstorm electricity.**—*Authors' abstract.*

9.2–272 551.594.21

Vonnegut, Bernard (*Arthur D. Little, Inc., Cambridge, Mass.*), **Possible mechanism for the formation of thunderstorm electricity.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers,* No. 42:169–181, Nov. **1955.** 6 figs., 17 refs., 11 eqs. **DLC**—It is proposed that electrification in thunderstorms is the result of strong updrafts and downdrafts that cause a multiplication of the small space charge normally found in the lower atmosphere. Because the air in the lower atmosphere contains a small positive space charge, clouds formed of this air have a small positive electric charge and produce an electric field. Under the influence of this field, negative ions from the upper atmosphere move down toward the cloud. These ions do not neutralize the cloud because they are caught in downdrafts that carry them down to the lower part of the cloud where they accumulate to form a large region of negative space charge. This charge finally becomes large enough to produce a large positive space charge by corona from points on the ground beneath the cloud. Air containing this increased positive space charge is carried by updrafts into the top of the cloud, causing it to become even more positively charged. This increases the rate of growth of the center of

negative charge and finally the charges become large enough to produce lightning. *Subject Headings:* **1. Thundercloud electrification 2. Lightning formation.**—*Author's abstract.*

9.2–273 551.594.221

Watson, R. A., **A lightning stroke on a hillside.** *Meteorological Magazine*, London, 86(1024):312–313, Oct. **1957. DWB**—On April 23, 1957, a lightning stroke hit the ground about 60 yds from A. P. CLARK, Black Hope Farm, Midlothian, making a crater 5 ft by 18 in. by >1 ft deep. *Subject Heading:* **1. Lightning strokes.**—*C.E.P.B.*

9.2–274 551.594.221

Lightning [over] Atlantic Ocean. *Marine Observer*, 27(178):208–209, Oct. **1957.** fig. **DLC**—On Oct. 17, 1956, lightning flashed slowly and regularly from a point slightly behind Ci at 25,000–30,000 ft in a straight line to small Cu at 2500 ft, then at normal speed in a different direction. B. F. J. SCHONLAND comments that the phenomenon has been observed several times and is due to positive charging of small cloud by ions rising in the negative field due to the cloud above. *Subject Heading:* **1. Lightning strokes.**—*C.E.P.B.*

RADIO METEOROLOGY

See also: **Radio wave distortion** (Hibberd), 9.2–185.

9.2–275 551.594.7:551.510.535

Bowhill, S. A., **Ionospheric irregularities causing random fading of very low frequencies.** *Journal of Atmospheric and Terrestrial Physics*, 11(2):91–101, **1957.** 11 figs., 2 tables, 13 refs. **DWB**—The process by which random irregularities in the ionosphere cause random fading in a reflected radio wave at the ground may be divided into two parts: the scattering process within the layer which builds up an inhomogeneous field in free space immediately beneath it, and the diffraction process by which this field propagates to the earth's surface, possibly changing in form as it travels. The extent of this change is evaluated by finding the correlation coefficients for three pairs of quantities measured experimentally at 75 and 150 kc/s frequency. These are (a) the signal amplitude at two horizontally separated receivers, (b) the amplitudes of the first and second reflections, (c) the amplitude and phase of the first reflection. The diffractive changes are found to be considerable, but the wave emerging from the layer is probably modulated in phase rather than amplitude. A study of the variation of fading speed at 75 kc/s with height of reflection appears to confirm existing ideas concerning the presence of small-scale irregularities above a critical height in the lower E-region. *Subject Heading:* **1. Radio fading.**—*Author's abstract.*

9.2–276 551.594.7:598.2

Harper, W. G., **'Angels' on centimetric radars caused by birds.** *Nature*, London, 180(4591):847–849, Oct. 26, **1957.** 4 figs., 7 refs. **DWB**—Widespread echoes on 10 cm radar at Dunstable are attributed to birds. They are most intense in spring and autumn; in Feb.–April their average heading is E.N.E., in Sept.–Dec. between S. and W. They commonly move faster than the wind at their height. The movements have been detected by telescope. *Subject Headings:* **1. Angels 2. Birds.**—*C.E.P.B.*

PART II. RECENT LITERATURE ON SOLAR ASTROPHYSICS

Compiled by: *Mary L. Rice*

INTRODUCTION

Astrophysics is the science dealing with the atmosphere of the sun and stars. This bibliography has been limited to include only material on *solar* astrophysics. Although a peripheral field, the subject is one that is becoming increasingly important to meteorologists.

The International Geophysical Year has taken cognizance of the importance of solar activity by organizing a program of observations of solar phenomena (sunspots, faculae, chromospheric flares, prominences, corona activity, radioelectric radiation from the sun, etc.).

For additional material on solar astrophysics the reader should consult the following bibliographies published previously in MAB: **Long Range Forecasting** (V. 2, p. 124, Feb. 1951), **Ionospheric Propagation** (V. 6, p. 489, April 1955), **Solar Relations with Weather** (V. 8, p. 95, Jan. 1957; *see* 9B–164), **Cosmic Rays in the Atmosphere** (V. 7, No. 3, p. 361, and No. 4, p. 488, March and April 1956) and **Radio Astronomy,** (V. 9, p. 72, Jan. 1958).

For current publications devoted to this subject, we recommend the following: **Annales d'Astropysique; L'Astronomie; Astrophysica Norvegica; Astrophysical Journal; Bulletin of the Astronomical Institutes of Czechoslovakia; Royal Astronomical Society, Monthly Notices;** and **Zeitschrift für Astrophysik.**

We wish to emphasize that this is *not* a systematic bibliography, but a collection of material from a large collection of unpublished abstracts available in the files of *MAB* at this time.

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1947–1949

9B–1 521.03(05)

Japanese Journal of Astronomy: Transactions, Vol. 1, No. 1, **1949.** Published Tokyo, by the Science Council of Japan. No. 1, 122 p. In English. Continuation of the **Japanese Journal of Astronomy and Geophysics** which began with Vol. 1, No. 1, **1922,** and ceased with Vol. 21, No. 3, **1947. DLC**—Contains numerous theoretical studies (in English) in astrophysics (atmospheres and spectroscopy of the sun and stars). *Subject Headings:* **1. Astrophysical journals 2. Periodicals. I. Japan. Science Council II. National Research Council of Japan.**—*M.R.*

9B–2 523.75:537.56

Suemoto, Zenzaburo (*Tokyo Astronomical Obs.*), **Ionization equilibrium in the solar chromosphere.** *Japanese Journal of Astronomy, Transactions,* Tokyo, 1(1):7–16, **1949.** fig., table, footrefs. **DLC**—Integral equations are solved for determining the radiative balance in the solar chromosphere. It is shown by numerical examples that Znastra's theory breaks down because of a serious error in neglecting the ionization from the second quantum state, in case the optical thickness t, is large. It is shown that from observation of ionized calcium atoms and the proportion of Ca to neutral H atoms the latter is quite large (10^{22}) and hence it may be safely assumed that the optical thickness t is very large compared with unity. *Subject Headings:* **1. Chromosphere 2. Ionization equilibrium.**—*M.R.*

1950

9B–3 523.74

Dewey, Edward R., **The 18-year cycle in sunspots with alternate cycles reversed.** *Cycles,* Riverside, Conn., 1(2):8–10, Sept. **1950.** 4 figs. **DWB**—Review of a paper by Anderson. The average sunspot numbers are taken for each second sunspot period with a minus sign. In this way

a 22½ year cycle with an amplitude of 150 numbers is found. The differences between the actual numbers and the average cycle show also periodic fluctuations. It is assumed that these fluctuations are formed by 17½ and 18½ year cycles. The average 18-year wave has an amplitude of 60 numbers. *Subject Headings:* **1. Sunspot cycles. I. Anderson, C. N.**—*A.A.*

9B–4 523.75:77

Waldmeier, M., **Sonneneruptionen und -protuberanzen.** [Solar eruptions and protuberances.] *Umschau*, Frankfurt a.M., 50(1):14–15, Jan. **1950.** figs. **DLC**—A series of 10 photos taken by the author with the coronograph of the Astrophysical Observatory in Arosa, Switzerland, on Sept. 13, 1947, is presented. The pictures show a solar protuberance and an eruption as viewed at 6-min intervals from 8.45 to 9.48 a.m. Explanatory notes are added. *Subject Headings:* **1. Coronographs 2. Solar eruptions 3. Solar protuberances 4. Arosa, Switzerland.**—*G.T.*

1951

9B–5 523.7:538

Alfvén, Hannes, **The impossibility of determining the sun's general magnetic field by Zeeman effect measurements.** *Nature*, London, 168(4285):1036, Dec. 15, **1951. DLC**—Conclusion from smallness of Zeeman effect that sun's general magnetic field is less than a few gauss is only valid in absence of turbulence. Rate of progression of sunspot zone puts field between 37 and 9 gauss. *Subject Heading:* **1. Solar physics.**—*C.E.P.B.*

9B–6 523.75

†d'Azambuja, L., **L'observation de la couronne solaire en dehors des éclipses. Note sur les disparitions brusques de protuberances.** [The observation of the corona without eclipses. Note on the sudden disappearance of protuberances.] *International Council of Scientific Unions, 7th Report of the Commission for the Study of Solar and Terrestrial Relationships*, pub. Paris, **1951.** p. 31–38. 16 refs. **DLC, DWB**—Describes coronograph and summarizes observations of intensity and spectrum of corona. Sudden disappearances are noted and their relation to geomagnetic disturbances discussed. *Subject Headings:* **1. Sun's corona 2. Coronographs.**—*C.E.P.*.

9B–7 523.7(05)

Belgium. Observatoire Royale de Belgique, **Monographies.** First issue received No. **1, 1950.** Last issue seen No. **2, 1951. DLC**—A new series containing substantial contributions to theoretical and empirical knowledge of astrophysics and astronomy. The form is similar to that of the **Memoirs** of the Institut Royale de Météorologie. *Subject Headings:* **1. Monograph series 2. Astrophysics.** —*M.R.*

9B–8 523.744

Bruzek, A., **Die Aktivität im laufenden Sonnenfleckenzyklus.** [The activity in the current sunspot cycle.] *Wetter und Leben*, 3(8):175–177, Aug. **1951.** fig., 3 tables. **DLC**—A summary of occurrences and areas of greatest sunspot groups and great eruptions, and monthly curve of relative sunspot numbers Jan. 1944–June 1951. *Subject Heading:* **1. Sunspot cycles.**—*C.E.P.B.*

9B–9 523.755

†Ellison, M. A., **Recent advances in the observation of solar flares (chromospheric eruptions).** *International Council of Scientific Unions, 7th Report of the Commission for the Study of Solar and Terrestrial Relationships*, pub. Paris, **1951.** p. 11–29. 2 figs., table, 75 refs. **DWB**—A summary of literature of past 20 years under: instruments and methods, with diagram of Edinburgh combined spectrohelioscope and spectrograph, and observational results, including location, classification, development, vertical motion, ejection of flare surges (and of source points of radio noise bursts) and spectrum. *Subject Heading:* **1. Solar flares.**—*C.E.P.B.*

9B–10 523.755

Evans, John W.; Yu, Ching-Sung and Witte, Bruno, **Preliminary results of flare observations from Feb. 15 to Nov. 15, 1950.** Harvard University, Contract W19-122ac-17, Special Report, No. 34, Jan. 5, **1951.** 12 p.+tables, diagr., refs. **DWB**—Quantitative and qualitative description of >200 flares observed at Sacramento Peak. Instrumentation, methods of observation and reduction, and a few tentative conclusions are discussed. It is evident that most of the flares appear in very restricted areas of the sun's surface. Two polar stereographic charts of the sun's surface show positions of 237 flares observed during ten 27 day periods in 1950. Spots, however, do not show this tendency to cluster. *Subject Headings:* **1. Solar flares 2. Sunspots 3. Sacramento Peak Observatory, Calif.**—*M.R.*

9B–11 523.74

Gleissberg, Wolfgang, **Die Schwankungen der Sonnenfleckenhäufigkeit.** [Variations of sunspot frequency.] *Naturwissenschaftliche Rundschau*, 4(5):196–200, May **1951.** 7 figs. **DWB, DLC**—An account of determination of relative numbers, variations of daily numbers and annual means, 11-year cycle and its variations in 80-year cycle. Author's method of forecasting spot numbers is described. There is also a progressive increase in asymmetry of 11-year cycle. *Subject Heading:* **1. Sunspot cycles.**—*C.E.P.B.*

9B–12 523.74/5

Kleczek, Josip (*Czechoslovakia Central Astron. Inst., Ondřejov*), **Solar asymmetry, Pt. 3.** *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 2(11/12):180–183, Dec. 31, **1951.** 7 tables, fig., 8 refs. **DLC**—Chromospheric flares on the eastern and western half of the solar disk are compared. More flares occur on the east. The asymmetry grows with importance. The duration of flares on east is longer. *Subject Headings:* **1. Solar activity 2. Solar flares.**—*Author's abstract.*

9B–13 523.74

***Kodaikanal solar and magnetic data, January–March 1951.** *Indian Journal of Meteorology and Geophysics*, 2(3):216–220, July **1951.** 4 tables, 3 figs. **DWB, DLC**—Data and graphs on solar activity. *Subject Headings:* **1. Solar activity 2. Geomagnetic data 3. Kodaikanal, India.**—*A.A.*

9B–14 523.74

Kopecký, M. (*Czechoslovakia Central Astron. Inst., Ondřejov*), **On breaks in the 11-year cycles of sunspots.** *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 2(11/12):176–180, Dec. 31, **1951.** 3 figs., 5 refs. **DLC**—The author shows that the sunspot frequency cycle cannot be described by a smooth curve, but is characterized by breaks with sudden changes, which occur during the maximum and one to three years before the maximum. The time between the two breaks is closely correlated to the value of the maximum ($r = -0.96$). *Subject Headings:* **1. Solar activity 2. Sunspot cycle.**—*A.A.*

9B–15 523.72

†*Labs, D., **Die Temperaturschichtung der Sonnenatmosphäre im Strahlungsgleichgewicht unter Berücksichtigung der Fraunhoferlinien.** [The temperature stratification of the sun's atmosphere considering the Fraunhofer lines.] *Zeitschrift für Astrophysik*, 29(3):199–252, **1951.** 6 figs., 13 tables, 62 refs., 65 eqs. **DLC**—This detailed study concludes that in spite of the Fraunhofer lines the sun only differs appreciably from a "grey body" in the extreme outer layer. In this thin layer the temperature falls very steeply and at the surface has a temperature of about 4300°K. *Subject Heading:* **1. Solar physics.**—*C.E.P.B.*

9B–16 523.74/5

*Link, F. and Mášková, D. (*Czechoslovakia Central Astron. Inst. Ondřejov*), **Catalogue d'éruptions observées à Ondřejov de 1948 à 1950.** [Catalogue of eruptions observed at Ondřejov from 1948 to 1950.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 2(11/12):186–196, Dec. 31, **1951.** 6 figs., table. **DLC**—Characteristic data of single eruptions are given, as well as a graphical representation of the course of each observed eruption. *Subject Headings:* **1. Solar flares 2. Solar activity 3. Ondřejov, Czechoslovakia.**—*A.A.*

9B–17 523.75:546.291

Miyamoto, Shotaro (*Inst. of Astrophysics, Kyoto Univ.*), **On the excitation of helium in the chromosphere.** *Astronomical Society of Japan, Tokyo, Publications*, 2(3):113–121, **1951.** 3 figs., 20 refs., eqs. **DLC**—As a contribution to the controversial problem of high or low kinetic temperature of the chromosphere, the author discusses properties of observed helium spectra and offers a series of calculations from which it would appear that the kinetic temperature of the chromosphere should not exceed 10,000°, instead of 35,000° as assumed by REDMAN and now generally adopted. *Subject Headings:* **1. Chromosphere 2. Helium in chromosphere.**—*G.T.*

9B–18 523.75

Müller, Rolf, **Im integralen Licht sichtbare Sonneneruptionen.** [Solar eruptions visible by their own light.] *Naturwissenschaften*, 38(23):545–546, Dec., **1951.** **DLC**—Describes an eruption on Dec. 11, 1948 seen at Wendelstein as a bright spot. This is very rare. *Subject Headings:* **1. Solar flares 2. Wendelstein, Germany.**—*C.E.P.B.*

9B–19 523.74

Pettit, Edison, **The sunspot with longest life.** *Astronomical Society of the Pacific, Leaflet* No. 269, Sept. **1951.** 7 p. table. **DWB**—A critical examination of conditions under which a sunspot

group was reputed to have persisted for 18 months (1840–1841). It is concluded that no group actually persisted for more than 136 days (1940) and the longest persistent group at any other time was in 1919 (141 days). The longest single spot duration is thought to be 113 days in 1946–47. *Subject Heading:* **1. Sunspot duration.**—*M.R.*

9B–20 523.75:681.177

Rush, J. H. and Witte, Bruno, **A study of the rotation of the solar corona by serial correlation of emission line intensities.** Harvard University, Contract W19-122ac-17, Special Report No. 40, July 31, **1951.** 14 p. 4 graphs, 6 eqs., refs. **DWB**—Rotation of the corona should be reflected in variations in emission line intensities as active regions are carried over the limb. In this study, green line intensities observed at Climax from 1 Aug. 1944 to 1 Aug. 1945 were subjected to a serial correlation analysis by IBM punched card techniques. Results are inconclusive, but the method developed here is expected to be of further use in this and other problems. *Subject Headings:* **1. Coronal emission lines 2. Sun's corona 3. Punched card analysis.**—*Authors' abstract.*

9B–21 523.7

Suemoto, Zenzaburo (*Tokyo Astron. Obs.*), **Line contours in the anomalous regions of the sun.** *Astronomical Society of Japan, Tokyo, Publications,* 2(4):137–149, **1951.** 10 figs., 9 refs., 27 eqs. **DLC**—Investigation of H_α, H_ϵ, H, and K lines in flares, flocculi, and flocculi over sunspots recently conducted at Tokyo Astronomical Observatory is reported. The spectral photographs were obtained through the observatory's tower telescope. Spectral intensity curves and photographs, and illustrations of equipment are presented. *Subject Headings:* **1. Solar phenomena 2. Solar spectrum 3. Japan.**—*G.T.*

9B–22 523.75

Waldemeier, M., **Die Sonnenkorona vom 28. Juli 1851.** [The solar corona of July 28, 1851.] *Zeitschrift für Astrophysik,* Berlin, 30(1):1–7, **1951,** 2 figs., 2 tables, 8 refs. **DLC**—The earliest known photo of a solar corona is credited to Berkowski at Königsberg (Kaliningrad) Astronomical Observatory, who took three photos of the solar eclipse of July 28, 1851. He used a Daguerre camera (exposure 20 sec, shutter opening 60 mm, focus 89 cm). An enlarged and reproduced photo was photometrically investigated to obtain the shape of the corona from the Ludendorff-coefficients, details of which are given in two tables: (1) dependence of the height of the corona on heliographic latitude and (2) ellipticity of the isophotes. *Subject Headings:* **1. Sun's corona 2. Solar photography.** —*W.N.*

1952

9B–23 523.72

Aller, Lawrence H. and Pierce, Keith A., **Model solar atmospheres.** *Astrophysical Journal,* 116(1):176–184, July **1952.** 7 figs., 3 tables. **DLC, DWB**—An iteration method is described for obtaining model stellar atmosphere when the temperature as a function of optical depth is known. This process is applied to the solar stratosphere, using an empirical temperature distribution based on observations of limb darkening. The total pressure, the electro-pressure and the absorption coefficient are tabulated as functions of the optical depths for different hydrogen-to-metal ratios. In addition, two solar models with He/H ratios of $\frac{1}{5}$ and $\frac{1}{20}$ are tabulated and compared with other models. *Subject Heading:* **1. Solar atmosphere.**—*Authors' abstract.*

9B–24 523.74

Ananthakrishnan, R., **Prominence activity and the sunspot cycle.** *Nature,* London, 170(4317): 156–158, July 26, **1952.** fig., 7 refs. **DWB**—Isopleths of mean daily prominence areas 1905–50 are compared with sunspot numbers. *Subject Heading:* **1. Solar activity.**—*C.E.P.B.*

9B–25 523.74

Behr, A. (*Freiburg i. Br.*) and Siedentopf, H. (*Tübingen*), **Zur statistik von Sonneneruptionen.** [Statistics of solar eruptions.] *Zeitschrift für Astrophysik,* 30(3):177–184, **1952.** 6 figs. ref. **DLC**—Solar eruptions have been observed systematically since 1935. The results are very uncertain owing to the subjective methods used. The average number of eruptions per hour in 1947 recorded from different observatories varies from 0.04 to 4.6. Nevertheless, the author could find a relationship between eruptions and sunspot numbers, a regular distribution of eruptions on the solar disk and a regularity in the visibility effect as a function of the distance from the central meridian. *Subject Headings:* **1. Solar eruptions 2. Sunspot numbers.**—*A.A.*

9B–26 523.74:550.38

Bernard, Pierre (*Institut de Physique du Globe*), **Les éruptions solaires d'après leurs effets sur le magnétisme terrestre.** [Solar eruptions according to their effects on terrestrial magnetism.]

L'Astronomie, Paris, 66:427–434, Nov. **1952.** figs., 27 refs. **DWB**—In this brief review the author presents and discusses reports on solar eruptions and simultaneous geomagnetic and ionization phenomena as observed and interpreted since 1859. Such reports reveal a definite cause-and-effect relationship between solar flares and geomagnetic disturbances. Among the more recent theories accounting for this relationship, the author mentions those of KIEPENHEUER, GIOVANELLI and MENZEL, and ST.-JOHN. *Subject Headings:* **1. Solar eruption 2. Terrestrial magnetism.**—*G.T.*

9B–27 523.74

Chvojková, E. (*Central Astronomical Inst., Ondřejov*), **Prediction of solar activity for several cycles.** *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 3(2):21–25, March 31, **1952.** 4 figs., table, refs. 3 eqs. **DLC**—The following formula is proposed for the form of a sunspot frequency cycle:

$$R = \tfrac{1}{2} R_m \left(1 - \mathrm{Cos}\, \frac{2\pi t}{aT + (1-a)t}\right);$$

R—relative number; index $_m$—value at the maximum sunspot frequency; t—time; T—duration of the cycle: $a = tm/T - tm$. The author studied the trends of the parameters involved for odd and even cycles and gives the following prediction:

Cycle	Year of beginning	Rm	T	tm/T
19	1956	100	13	.33
20	1969	30	14.5	.4

Subject Heading: **1. Sunspot cycles.**—*A.A.*

9B–28 523.77

Dufay, J., (*Lyon Observatory*), **Sur la recherche des raies interdites $^2D - {}^2P$ de l'atome neutre d'azote dans le spectre d'absorption de l'atmosphère solaire.** [Investigation of the forbidden bands $^2D - {}^2P$ of the neutral atom of nitrogen in the absorption spectrum of the solar atmosphere.] *Annales d'Astrophysique*, 15(13):359–360, **1952.** 8 refs. **DWB, DLC**—Suggests that the weak line 10,397.57 Å, given in the list of BABCOCK-MOORE might correspond to one of the forbidden transitions of NI. *Subject Headings:* **1. Solar atmosphere 2. Solar spectrum.**—*A.A.*

9B–29 523.7

Elwert, Gerhard, **Über die Ionisations- und Rekombinationsprozesse in einem Plasma und die Ionisationsformel der Sonnenkorona.** [On the ionization and recombination processes in a plasma and the ionization formula of the sun's corona.] *Zeitschrift für Naturforschung*, 7a(6):432–439, June **1952.** 3 figs., 2 tables, 25 refs., 31 eqs. **DLC**—A mathematical discussion of photoionization and ionization by electrons, and recombination by emission of electrons, is applied to the sun, giving the temperature of the corona as between 6×10^5 and 8×10^5 deg. *Subject Heading:* **1. Solar physics.** —*C.E.P.B.*

9B–30 523.74(09)

Fleckenstein, J. O., **100 Jahre solarterrestrische Erscheinungen. Zur Entdeckung der $11\frac{1}{9}$ jährigen Periode der Sonnenfleckentätigkeit durch Rudolf Wolf (1852).** [100 years of solar-terrestrial phenomena. On the discovery of the $11\frac{1}{9}$ year period of sunspot activity by Rudolf Wolf (1852).] *Experientia*, 8(12):476–477, Dec. 5, **1952.** 2 refs. **DLC**—Brief historical account of the discovery of the sunspot period and "relative number." *Subject Headings:* **1. Sunspot cycles 2. Wolf, R.**—*C.E.P.B.*

9B–31 523.741

Frenkiel, F. N. (*Johns Hopkins Univ.*) and Schwarzschild, M. (*Princeton Univ. Obs.*), **Preliminary analysis of the turbulence spectrum of the solar photosphere at long wave lengths.** *Astrophysical Journal*, 116(2):422–424, Sept. **1952.** 2 figs., 2 tables, 7 eqs. **DWB**—The available data on the velocities of granules are analyzed according to the methods of the statistical theory of turbulence. The analysis indicates that the turbulence spectrum of the solar photosphere may not be of a simple form but may have—in addition to the suspected primary maximum at wave lengths of the order of 300 km—a secondary maximum at long wave lengths of about 15,000 km. *Subject Headings:* **1. Solar activity 2. Photosphere.**—*Authors' abstract.*

9B–32 523.74(02)

*Gleissberg, Wolfgang, **Die Häufigkeit der Sonnenflecken.** [The frequency of sunspots.] *Scientia Astronomica*, Vol. 2, pub. Berlin, Akademie-Verlag, **1952.** 11+91 p. 28 figs., 16 tables, foot-refs. **GB-MO.** Review by M. Rodewald in *Naturwissenschaftliche Rundschau*, 10(1):39,

Jan. 1957. **DLC**—Ch. 1 deals with observation and development of sunspots, effect of sun's rotation, relative number with table of monthly and annual values 1749–1951 and spot areas. Ch. 2–4 describe the 11-year cycle and its variations since 1610, and short-period sunspot forecasting, the 80-year cycle and other long-period variations, and the solar rotation period and annual cycle. Ch. 5 sets out distribution and migration of spots on the surface. Ch. 6 summarizes theories of their origin: planetary influences, V. BJERKNES' hypothesis of vortexes in the photosphere, and that of ALFVÉN and WALEN of magneto-hydrodynamic waves (to account for their strong magnetic field). Finally, relations are briefly discussed with solar faculae, granulation, protuberances, corona and chromosphere eruptions, radio radiation, ionosphere, geomagnetic disturbances and aurora. *Subject Headings:* **1. Solar phenomena 2. Sunspots 3. Textbooks.**—*C.E.P.B.*

9B–33 621.396.8:523.7

Kitamura, Masatoshi and Kadena, Muneyasu, **On the effect of absorption of the solar noise by the corpuscular stream.** *Japan. Science Council. Ionosphere Research Committee, Report of Ionosphere Research in Japan*, 6(4):216–217, Dec. **1952. DWB**—*Subject Heading:* **1. Solar radio noise.**

9B–34 523.74(437)

*Kleczek, Josip, **Katalog činnosti chromosférických erupcí, část první.** [Table of the activity of chromospheric eruptions, Pt. 1.] *Prague. Ústřední Ústav Astronomický, Publikace*, No. 22, **1952.** 103 p. mostly tables. In French, Czech and Russian. Price: 90 Kčs. **DLC**—Amounts of total energies emitted by solar eruptions are tabulated for every day of the years 1936–1949. Date, location of the eruption of the solar disc and total energy (intensity times duration) are listed in each case. The table was compiled with some adjustments from the observation material contained in the **Quarterly Bulletin on Solar Activity,** which publishes data furnished by observatories participating in a systematic investigation of the chromosphere. *Subject Headings:* **1. Solar eruptions 2. Chromosphere investigations 3. Czechoslovakia.**—*G.T.*

9B–35 523.7

Menzel, Donald H. and Bell, Barbara, **Survey of problems for solar observations.** Harvard University. Observatory. Solar Dept. Contract AF 19(604)-146, Scientific Report, No. 1, June 20, **1952.** 21 p. **DWB**—This report outlines a number of solar problems for observational investigation. The outline is intended to serve as a long-range guide for planning the observation programs at the Sacramento Peak Station, and should not be interpreted as an expression of immediate intentions. We discuss patrol programs for daily observations of prominences, flares, etc., some of which are already in operation at the Peak, and mention possible eventual improvements. The major part of the report discusses background research programs for the 16-inch coronograph. We consider research on both active and normal solar features. The active features of the sun are, of course, more directly related to terrestrial disturbances, but these active features can best be interpreted in terms of a well-established reference system of normal solar conditions. In connection with each program we list the accessory equipment necessary to carry it out. Some of the observations can well be made with equipment already existing at other solar observatories and will not necessarily be attempted at the Peak. *Subject Heading:* **1. Solar research.**—*Authors' abstract.*

9B–36 523.755

*Michard, Raymond, **Densités électroniques dans la couronne externe du 25 février 1952.** [Electronic densities in the external corona of Feb. 25, 1952.] *Annales d'Astrophysique*, 17(6):429–442, Nov./Dec. **1954.** 6 figs., 4 tables, 16 refs. **DWB**—The electronic density N in the corona was determined for the distance to the center of the sun $1.5 < \rho < 10$ solar radii, according to photometric and polarimetric observations of the French expedition to Khartoum ($2.5 < \rho < 10$), supplemented by those of the Expedition of the Observatory of Arcetri. It was assumed that all the observed polarization is due to the electronic diffusion (corona F not polarized). The equatorial corona from the edge of the great jets, the polar corona and the great Eastern jet are considered separately. It was found that the electronic densities are significantly higher than those of the models of VAN DE HULST, especially in the polar zones. The departure of log N in the great Eastern jet and in its vicinity rapidly increases to $\rho \simeq 3.5$ then remains constant to a great distance from the star. Other properties of the jet present a kind of discontinuity toward $\rho \simeq 3.5$. *Subject Headings:* **1. Sun's corona 2. Solar electronic density.**—*Trans. of author's abstract.*

9B–37 523.74

Michard, Raymond, **Nouvelles observations photométriques des taches solaires.** [New photometric sunspot observations.] *Académie des Sciences, Paris, Comptes Rendus*, 235(15):791–793, Oct. **13, 1952.** 2 tables, 3 refs., eq. **DWB**—The relation I'/I (I' = minimum intensity of

the sunspot; I = intensity of normal photosphere at equal distance with sunspot from the solar center) was determined for 250 spectra obtained during the summer 1950 at Meudon Observatory. Corrections made for poor centering, and interference of photospheric light into the sunspot image due to atmospheric or instrumental diffusion or atmospheric turbulence, are explained. Data on the relation between I'/I and $\cos\theta$ (θ = angle of direction of observation and of a line normal to the solar surface) and between I'/I and A (area of sunspot shadow) are tabulated. *Subject Headings:* **1. Sunspot observation 2. Photometers 3. Meudon, France.**—*G.T.*

9B–38 523.7

Mineur, Henri and Peyturaux, Roger (*Astrophysical Inst., Paris*), **Exploitation numérique de l'équation intégrale d'assombrissement au bord solaire pour obtenir la fonction source.** [Numerical analysis of the integral equation of darkening in the rim of the sun for obtaining the source function.] *Annales d'Astrophysique*, 15(4):383–401, **1952.** 10 figs. **DLC**—Values of $\phi(u)$ for the darkening of the sun at a certain angular distance from the center of the solar disk, have been obtained at the Pic du Midi and are calculated and tabulated. The Laplace formula is shown to be inapplicable to the solution of the equations with respect to $S(t)$. By a method of 5 successive approximations, a solution has been reached which compares favorably with theoretical results obtained by Kourganoff. *Subject Headings:* **1. Solar rim darkening 2. Source functions 3. Astrophysics.**—*M.R.*

9B–39 523.74

Öhman, Y. and Lodén, L. O. (*Stockholm Obs.*), **Sunspot areas, flares and filaments observed at the Stockholm Observatory in the years 1950 and 1951.** *Tellus*, 4(3):241–248, Aug. **1952.** 2 figs., 5 tables. **DLC**—Tables giving the sunspot areas, flares and filaments for every day of the years 1950–51 according to the routine solar observations carried out at the Stockholm Observatory. Polar maps of the sun have been used for distributing the twice weekly reports on the general solar activity. The polar map type used is illustrated and its use is described. *Subject Headings:* **1. Sunspots 2. Solar flares 3. Polar maps 4. Stockholm, Sweden.**—*I.L.D.*

9B–40 523.7:550.3

Organizatsiia komissii po geliogeofizike. [Organization of a Commission on "Heliogeophysics."] *Vsesoiuznoe Geograficheskoe Obshchestvo, Leningrad, Izvestiia*, 84(5):525–526, Sept./Oct. **1952. DLC**—The Commission on Heliogeophysics was established by the Geographical Society of the U.S.S.R. for the purpose of directing, coordinating and initiating studies on solar influences upon terrestrial phenomena. The chairman was V. IU. Vize; the other members were A. V. Shnitnikov, vice chairman; S. P. Khromov; A. I. Dzenslitovskii; L. A. Vitel's and B. M. Rubashev. The titles of papers delivered at meetings of the commission are mentioned. *Subject Headings:* **1. Solar influences 2. Heliogeophysics.**—*I.L.D.*

9B–41 523.72

Osterbrock, Donald E. (*Yerkes Obs., Williams Bay, Wis.*), **The electrical conductivity in the solar atmosphere.** *Physical Review, 2nd Ser.*, 87(3):468–470, Aug. 1, **1952.** fig., table, 9 refs., 16 eqs. **DLC**—The electrical conductivity in the solar atmosphere is computed from the physical properties of the solar material. It is shown that as a consequence of the high abundance of hydrogen the mean free paths of the free electrons are determined by collisions with neutral hydrogen atoms and not by collisions with the much less abundant ions. Furthermore, for magnetic fields less than about 750 gauss the curvature of the trajectories of the free electrons is small enough for the ordinary Ohm's law to be a good approximation. *Subject Headings:* **1. Solar atmosphere 2. Electrical conductivity of air.**—*Author's abstract.*

9B–42 523.72

Ovenden, Michael W., **The general magnetic field of the sun.** *Science Progress*, London, 40(158):255–262, April **1952.** table, refs. **DWB**—A summary of recent work on the general solar magnetic field, with references to its bearing on the corona, cosmic rays and solar radio radiation. *Subject Headings:* **1. Sun's magnetic field 2. Solar physics.**—*C.E.P.B.*

9B–43 523.74/5

Pajdušaková-Mrsková, L. (*Central Astronominal Inst., Skalnaté Pleso*), **Relation entre l'activité des hémisphères boréal et austral solaires.** [Relationship between the solar activities on the Northern and Southern Hemispheres.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 3(2):17–21, March 31, **1952.** 5 figs., 6 tables, 7 refs. **DLC**—The author calculated correlation coefficients for sunspots, chromospheric eruptions, and active regions and came to the conclusion that no direct or indirect correlation exists. *Subject Heading:* **1. Solar activity.**—*A.A.*

9B–44 523.74

Petri, Winfried, **Monochromatische Fluktuationen der inneren Sonnenkorona.** [Monochromatic fluctuations in the inner solar corona.] *Zeitschrift für Astrophysik*, 31(3):195–206, **1952.** 12 tables, 18 refs. **DLC**—The strongest short time variations (10 min–2 days) of the monochromatic intensity occurs at the solar lat. 15–20° but not in the zone of main activity near the equator. Density and temperature affect the location of these disturbances. Their length is about 24,000 km. *Subject Heading:* **1. Solar disturbances.**—*A.A.*

9B–45 523.74:525

Pikel'ner, S. B., **Khromosfera i khromosfernye vspyshki na solntse.** [Chromosphere and chromospheric explosions on the sun.] *Priroda*, Moscow, No. 12:25–35, Dec. **1952.** 3 figs., plate, refs. **DLC**—Semipopular account of some recent work done by Russian scientists mainly at the Astrophysical Observatory of Crimea, which includes: construction of a polarization filter for current observations and photographic recording of faculae, construction of a spectroheliograph, spectroanalysis of faculae and chromospheric explosions, theory of faculae, periodocities in the solar corona, solar-terrestrial relationships, solar radiation in radio bands, origin of magnetic storms and auroras, etc. *Subject Headings:* **1. Solar activity 2. Solar-terrestrial relationships 3. U.S.S.R.**—*A.A.*

9B–46 523.74:634.9

Rush, J. H. (*High Altitude Obs., Harvard Univ. and Univ. of Colorado*), **Tree rings and sunspots.** *Scientific American*, 186(1):54–58, Jan. **1952.** 4 figs. **DLC, DWB**—The life work of ANDREW E. DOUGLASS is summed up. The scientist examined the growth pattern of trees, several over 3000 years old, and also wood from ancient Aztec ruins and 38 petrified sequoia specimens from the Tertiary period. He found a definite correlation between growth of trees and sunspot activity and compiled a continuous 1900-year record of results obtained. He also noted the existence of an 11-year sunspot cycle some 50 million years ago. Photos of tree rings and of an ancient Aztec building with built-in beams are presented. Details of the scientist's methods and conclusions are indicated in general terms. *Subject Headings:* **1. Dendrochronology 2.Sunspots.**—*G.T.*

9B–47 523.74

Temesváry, Stefan, **Der Rotationszustand der Sonne.** [The rotation condition of the sun.] *Zeitschrift für Naturforschung*, 7a(1):103–120, Jan. **1952.** 9 figs., numerous refs., 69 eqs. **DLC**—It is shown that if interplanetary matter exerts a braking effect, in addition to the hydrogen convective zone, a zone of rotational instability exists, which probably causes a stationary circulation. The 11-year sunspot migration cycle is a consequence of this. *Subject Headings:* **1. Solar physics 2. Sunspot cycles.**—*C.E.P.B.*

9B–48 523.72

Wegener, Kurt (*Graz Univ., Austria*), **Über die Temperatur der Sonne nach dem Wien'schen Verschiebungsgesetz.** [The temperature of the sun according to Wien's displacement law.] *Geofisica Pura e Applicata*, 23:145–146, **1952.** fig. English summary p. 145. **MH-BH**—Two bolometer curves published by the Astrophysical Observatory in Washington, D. C. (for a dry and humid day) are analyzed. The author emphasizes that the measured energy values must be divided on $\Delta\lambda$ (difference of wave lengths), regarding the thickness of the bolometer wire, in order to obtain comparable energy values. WIEN's law gives in this case a temperature of about 6100°K. *Subject Headings:* **1. Bolometers 2. Solar temperature.**—*A.A.*

1953

9B–49 523.74

*Alfvén, H. (*Royal Inst. of Tech., Stockholm*), **Identification of sunspots.** *Tellus*, Stockholm, 5(4):423–445, Nov. **1953.** 4 figs., 2 tables, refs., eqs. **DLC**—According to the magneto-hydrodynamic theory of sunspots there should be a correlation between the spots on one hemisphere during a certain cycle and spots on the opposite hemisphere during the following cycle. This has been statistically confirmed by GALVENIUS and WOLD, and by WHITTLE. It is pointed out that individual sunspot groups may be reproduced at the opposite hemisphere during the following cycle. An analysis of the sunspots between $-4°$ and $+4°$ seems to support this conclusion, and a number of sunspots are "identified" as being produced by the same original disturbance in the solar core. *Subject Headings:* **1. Magneto-hydrodynamic theory 2. Sunspot correlation 3. Sunspot cycles.**—*Author's abstract.*

9B–50 523.74

Bartlett, Thomas J., Witte, Bruno and Roberts, Walter Orr, **Eruptive prominence associated with limb flare of May 8, 1951.** *Astrophysical Journal*, 117(2):292–297, March **1953.** 3 figs., table.

DLC—A solar prominence of violently eruptive character accompanied the limb flare of May 8, 1951. Measures of several knots in the prominence show that forces large compared with solar gravitation were present but no simple laws of motion emerge from the data. *Subject Heading:* **1. Solar flares.**—*Authors' abstract.*

9B–51 523.746

Becker, U. and Kiepenheuer, K. O., **Über ein solares Mass der Fleckentätigkeit.** [On a solar measure of spot activity.] *Zeitschrift für Astrophysik*, 33(2):132–141, **1953.** 6 figs., 6 refs. **DLC**—With the help of the visibility function of sunspots and by extrapolation of its observed time development daily values of the number of sunspots over the whole solar surface are calculated for 1948. It is shown that this global measure of spottedness is practically free from the solar rotation period and independent of the heliocentric position of the observer. *Subject Heading:* **1. Sunspots.**—*From author's abstract.* (*C.E.P.B.*)

9B–52 523.75

*Bell, Barbara and Glazer, Harold, **Comparison of annual intensities of coronal emission lines: Climax, Sacramento Peak, Arosa, Kanzelhöhe, Pic du Midi, Wendelstein.** Harvard Univ. Observatory. Solar Dept., Contract AF 19(604)-146, scientific Report, No. 12, Sept. 30, **1953.** 78 p. 18 figs., numerous tables, 20 refs. **MH-BH.** *Subject Heading:* **1. Coronal emission lines.**

9B–53 523.75

Bhatnagar, P. L.; Krook, M.; Menzel, D. H. and Thomas, R. N., **"Turbulence," kinetic temperature and electron temperature in stellar atmospheres.** Harvard University. Harvard Solar Dept. Contract AF 19(604)-146, Scientific Report No. 8, July 16, **1953.** 15 p. 11 refs., 19 eqs. **DWB**—The "chromosphere-corona" atmosphere of the sun is inconsistent with the "normal" stellar atmosphere model, because of (a) the large extent of the "chromosphere-corona" and its low density gradient; and (b) the existence of high values of the electron and kinetic temperatures (T_e and T_k) somewhere in the "chromosphere-corona." In the past, two extreme modifications of the "normal" atmosphere have been proposed to explain (a). The first involves some type of purely macroscopic motions, loosely termed "turbulence"; the second involves a high T_k in the chromosphere. The authors discuss these models and point out inadequacies of each of them. In particular, radio astronomers state that T_e must be lower than the T_k needed for a model of the second type in the solar chromosphere. Alternative explanations are considered, especially the possibility of reconciling a high T_k with a low T_e. Various reports in the literature, especially concerning discharge-tube phenomena, state the possibility of configurations with T_e significantly different from T_k. The authors investigate this problem theoretically and conclude that T_e cannot differ significantly from T_k for $T_e \gtrsim 10^{80}$K. *Subject Headings:* **1. Chromosphere 2. Kinetic temperatures 3. Electron temperatures 4. Stellar atmospheres 5. Chromosphere temperatures.**—*Authors' abstract.*

9B–54 523.75:535.24

Billings, Donald E. and Roberts, Walter Orr (*High Altitude Obs. of Harvard Univ and Colorado Univ.*), **Isophotal photometry of a solar flare.** *Astrophysical Journal*, Chicago, Ill., 118(3):429–435, Nov. **1953.** 4 figs., 30 refs. **DLC**—The paper presents isophotal contour maps of the solar flare of April 12, 1950, at various stages of development, and a plot of integrated intensity of the flare as a function of time. Our measurements indicate that at flare maximum the earth received a radiation of solar H_α energy/sec which exceeded "quiet"-sun H_α radiation by nearly 2×10^{18} ergs/sec. The estimated total energy in H_α reaching the earth from the sun between the recognized start of the flare and its end exceeded that from the quiet sun for a corresponding time interval by approximately 9×10^{21} ergs. *Subject Headings:* **1. Solar flares 2. Photometry 3. Corpuscular radiation.**—*Authors' abstract.*

9B–55 523.746

Bracewell, R. N., **The sunspot number series.** *Nature*, 171(4354):649–650, April 11, **1953.** 2 figs. **DWB**—By reversing sunspot relative numbers in alternate 11-year cycles (Hale effect) author obtains a curve symmetrical about zero which is much more suitable as a basis for forecasting than the 11-year curve. Correlation between rate of fall from max to min and rate of rise from min to next max 0.57. *Subject Heading:* **1. Sunspot cycles.**—*C.E.P.B.*

9B–56 521.03

Chandrasekhar, S. and Fermi, E. (*Chicago Univ.*), **Magnetic fields in spiral arms.** *Astrophysical Journal*, 118(1):113–115, July **1953.** 6 foot-refs., 15 eqs. **DWB**—In this paper two independent methods are described for estimating the magnetic field in the spiral arm in which we are located. The first method is based on an interpretation of the dispersion (of the order of 10°) in the observed planes of polarization of the light of the distant stars; it leads to an estimate of $H = 7.2\times10^{-6}$ gauss.

The second method is based on the requirement of equilibrium of the spiral arm with respect to lateral expansion and contraction: it leads to an estimate of $H = 6 \times 10^{-6}$ gauss. *Subject Heading:* **1. Magnetic fields in spiral arms.**—*Authors' abstract.*

9B–57 523.72

Das, A. K. and Abhyankar, K. D., **Difference of temperature between pole and equator of the sun.** *Nature*, London, 172(4376):496–497, Sept. 12, 1953. 8 refs. **DWB**—Using WOOLLEY's method, pole was found to be 86–96° warmer than equator and depth of a sunspot vortex 125–140 km. *Subject Heading:* **1. Solar temperature.**—*C.E.P.B.*

9B–58 523.74

Gleissberg, W., **Voraussage über die Epoche des nächsten Sonnenfleckenmaximums.** [Forecast of the epoch of the next sunspot maximum.] *Zeitschrift für Astrophysik*, 33(1):31–38, **1953.** 3 refs., 11 eqs. **DLC**—On the assumption that the tendency of the last four sunspot cycles has not yet reached its maximum, author finds, with a probability of 99%, that the interval between last and next maxima will be less than 11.1 years and that the next maximum will occur before June 1958. *Subject Heading:* **1. Sunspot cycle.**—*C.E.P.B.*

9B–59 523.77:546.264

Goldberg, Leo and Müller, Edith A. (*McMath-Hulbert Observatory, Univ. of Michigan, Pontiac*), **Carbon monoxide in the sun.** *Astrophysical Journal*, Chicago, Ill., 118(3):397–411, Nov. **1953.** 3 figs., 5 tables, 26 foot-refs., 13 eqs. **DLC**—Nearly 300 lines of carbon monoxide have been identified in the spectrum of the solar limb between 2.29 and 2.50μ. The lines belong to the overtone bands 2–0, 3–1, 4–2, 5–3, 6–4, and 7–5. Analysis of the solar wave lengths has led to a new determination of the vibrational and rotational constants of the CO molecule. The measured absorption coefficients of PENNER and WEBER and the theoretical values of SCHOLZ have been applied to the measured equivalent widths at the center of the disk. The resulting equivalent abundance of CO is 1.45×10^{19} molecules per square centimeter above the photosphere, and the excitation temperature is 4300°K. It is shown from model-atmosphere calculations that solar CO is concentrated near the top of the photosphere and hence that the derived excitation temperature is consistent, since it agrees with the boundary temperature. At present, it is not known whether the dissociation energy of CO is 9.6 or 11.1 e.v. If the lower value is correct, the solar-line intensities suggest that the boundary temperature is less than 4500°K. The exact value of the temperature depends on the choice of atomic abundances for O and C. The low intensities of the fundamental band lines of CO in the 4.6μ region are explained as a consequence of (1) the high opacity of the solar atmosphere at long wave lengths, (2) the importance of stimulated emissions in the infrared, and (3) the small collisional line widths in the sun's outer layers. *Subject Headings:* **1. Carbon monoxide in the sun 2. Solar spectrum.**—*Authors' abstract.*

9B–60 523.746

Kiral, A., **Fortschreitende Änderung der Gestalt der Sonnenfleckenkurve.** [Progressive change of shape of the sunspot curve.] *Naturwissenschaften*, 40(18):477–478, Sept. 15, **1953.** ref. **DWB**—In addition to 11-year and 8-year sunspot cycles, there is a progressive increase of asymmetry of 11-year cycle $A = 1 - T/U$ where T is time from minimum to maximum and U from maximum to minimum. In 5 groups of 6 cycles each A has changed steadily from -0.12 to $+0.27$. *Subject Heading:* **1. Sunspot cycles.**—*C.E.P.B.*

9B–61 523.75:523.74

Kleczek, J., **Relations between flares and sunspots.** *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 4(1):9–14, Feb. 1, **1953.** 4 figs., 5 tables, 12 refs. Russian summary p. 14. **DLC**—Frequency of flares, relative Wolf's number and area are derived for 9 types of groups. It is shown that the sun's flare activity depends on: 1) the probability of a flare occurring near the spot groups of certain types, and 2) frequency of types of groups. The differences in relations between flares and spots of present and past cycles can be explained from these parameters. *Subject Headings:* **1. Solar flares 2. Sunspots.**—*M.R.*

9B–62 523.74

Kopecký, M., **Statistika piaten na vrashchaiushchemsia solntse.** [Statistics of spots on the rotating sun.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 4(1):1–9, Feb. 1, **1953.** 6 figs., 11 refs., 33 eqs. English summary p. 8–9. **DLC**—A study based on theoretical and observational considerations of the various indices of sunspot activity with relation to the 11-year cycle. It is shown that the observed number of groups of spots (N) derived from Minaert's diagram, and the relative (Wolf) sunspot number (R) are closely correlated, but that the total number of

sunspots on the entire sun (f) (as distinct from observed number) and their duration (T) are better indices of the 11-year cycle than is R or N. Data for 1890–1950 are plotted and analyzed to support this idea. Asymmetry (E-W) is greater when (T) is greater. *Subject Headings:* **1. Sunspot activity 2. Sunspot cycles 3. Sunspot data analysis.**—*M.R.*

9B–63 523.747

Larmore, Lewis (*Univ. of Calif., Los Angeles, Calif., Phys. and Astr. Depts.*), **A study of the motions of solar prominences.** *Astrophysical Journal*, Chicago, Ill., 118(3):436–452, Nov. **1953.** 12 figs., 5 tables, 10 foot-refs., 11 eqs. **DLC**—The motions of knots of four prominences were studied from Climax films. Measurements were taken by means of a polar grid superimposed on photographic prints of each frame. The four prominences include active, eruptive, sunspot, and active-eruptive types. There are no cases of sudden velocity increase, as found by PETTIT. The good detail shown by the Climax films points to a twofold explanation of the supposed first law of prominence motion. It is attributed to (1) approximations involved in curve-fitting and (2) overtaking or ambiguity of identification of the knots and streamers. A parabola approximates the time-distance diagrams to a high degree of accuracy. On this basis, average accelerations are determined graphically for 85 knots and listed for both radial and angular components. The trajectories follow closely those computed by EVANS on the basis of an electromagnetic field. The force fields for knots traveling similar trajectories are found to be nearly constant with time as long as the form of the prominence is constant, but the forces apparently change when the form changes. A theory of an eruptive mechanism for prominences is suggested. *Subject Heading:* **1. Solar prominences.**—*Author's abstract.*

9B–64 523.7

Layzer, David, **Theory of linear flame propagation, Pt. 1, Existence, uniqueness, and stability of the steady state. Pt. 2, Structure of the steady state.** Harvard Univ. Observatory, Solar Dept., Scientific Report, No. 13, **1953?** Contract AF 19(604)-146. 32 p. 4 refs., numerous eqs. **MH-BH**—It is shown that the equations governing the steady, adiabatic, one-dimensional propagation of single-reaction flames admit an infinity of solutions, only one of which, however, can be realized physically. The steady state is shown to be stable against small perturbations, and the possibility of reconciling this result with apparently contradictory experimental data is discussed. *Subject Heading:* **1. Solar physics.**—*Author's abstract.*

9B–65 523.74

Maksimov, I. V., **O vekovykh izmeneniiakh odinnadtsatiletnego tsikla solnechnoĭ deiatel'nosti.** [Secular trend of the 11-year cycle of solar activity.] *Akademiia Nauk SSSR, Doklady*, 92(6):1149–1152, Oct. 21, **1953.** 2 figs., 4 refs. **DLC**—The nature of 11-year period of solar activity, and its variation in time and length are studied. Mean annual Wolf's numbers are analyzed periodographically making use of SHUSTER's method applied to observations from 1750–1934. Rather inconclusive. *Subject Heading:* **1. Solar cycle.**—*N. T. Zikeev.*

9B–66 523.74

Mattig, W., **Die radiale Verteilung der magnetischen Feldstärke in normalen Sonnenflecken.** [Radial distribution of magnetic field intensity in normal sunspots.] *Zeitschrift für Astrophysik*, 31(4):273–281, **1953.** 2 figs., 2 tables, 11 refs. **DLC**—On the basis of observational data obtained at the Einstein Tower in Potsdam [since 1942], Broxon's formula for the distribution of magnetic field intensity in normal sunspots is revised and replaced by a new empirical formula. *Subject Headings:* **1. Sunspots 2. Magnetic field intensity.**—*Author's abstract* (*transl.*).

9B–67 523.752

Menzel, Donald H. and Evans, John W., **The behaviour and classification of solar prominences.** Harvard University. Observatory. Solar Dept., Contract AF 19(604)-146, Scientific Report, No. 9, July 16, **1953.** 24 p. refs. **DWB**—From a study of the long series of motion picture records of solar prominences in the light of H_α, made at Climax and Sacramento Peak, the authors present a new scheme of prominences into physically distinct groups. Each group is defined by a minimum number of fixed criteria and is homogeneous in a variety of significant characteristics peculiar to that group alone. They make the fundamental distinction between prominences that appear to originate in coronal space with material moving predominantly downward and prominences that appear to originate in the chromosphere and move upward. Within each group, prominences are further divided according to whether they occur in the vicinity of a sunspot or over undisturbed regions of the solar surface. The form and behavior typical of various sub-groups of prominences within these categories are described. While based firmly on observation, the classification is guided by the authors' beliefs concerning the nature of prominences. They consider that electromagnetic forces determine prominence form, motion and support, that the differences between prominences result

from differences in the magnetic field at their place of origin and in the space where they are observed. They discuss qualitatively the behavior of currents and magnetic fields and indicate applications of the magnetohydrodynamic principles to the various types of prominences. *Subject Headings:* **1. Solar prominence classification 2. Magnetic field.**—*Authors' abstract.*

9B–68 523.75

Menzel, Donald H. and Bell, Barbara, **The variation in prominence distribution over the sunspot cycle.** Harvard University. Observatory. Solar Dept., Contract AF 19(604)-146, Scientific Report, No. 10, July 27, **1953.** 7 p. 26 maps, 6 refs. **DWB**—A series of twenty-six maps exhibit the distribution and orientation of dark H_α filaments (prominences) on the sun's disk. The maps, one per year, are derived from the **Cartes synoptiques** of D'Azambuja and cover about two and a half solar cycles, from 1919 through 1944. The changes in position and pattern of the filaments over the solar cycle are noted. These patterns suggest a magnetohydrodynamic interpretation, which is briefly outlined. *Subject Headings:* **1. Solar prominences 2. Sunspot cycles.**—*Authors' abstract.*

9B–69 523.72

Michard, Raymond, **Les conditions physiques dans les taches solaires, déduites de leur spectre.** [Physical conditions in sunspots deduced from their spectra.] *Académie des Sciences, Paris, Comptes Rendus,* 236(2):182–184, Jan. 12, **1953.** refs. **DWB**—Theoretical consequences of an empirical model of the surface layers of a large sunspot, particularly the vertical gradient of the magnetic field. *Subject Headings:* **1. Sunspots 2. Solar atmosphere.**—*Author's abstract (transl.).*

9B–70 523.77

Miyamoto, S. (*Kyoto, Japan*), **Residual intensity and contour of the solar K-line.** *Zeitschrift für Astrophysik,* 31(4):282–297, **1953.** fig., table, 21 refs., 75 eqs. **DLC**—The high residual intensity and large width of K_2 emission are explained by considering the electron collision and the noncoherent scattering due to the thermal Doppler effect in the chromosphere. The chromosphere is very opaque for the core radiation. The quanta created by electron collisions within the Doppler core escape through the less opaque wing region by a frequency redistribution. The wing extension of the K_2 emission ceases where the chromosphere becomes transparent for that frequency. The variation of residual intensity according to the fluctuation of the chromospheric electron density is discussed briefly. *Subject Heading:* **1. Solar spectrum.**—*Author's abstract.*

9B–71 523.755

Müller, Rolf, **Über die Rotation der inneren Korona.** [Rotation of the inner corona.] *Zeitschrift für Astrophysik,* 32(2):104–115, **1953.** 6 figs., 7 tables, 8 refs. **DWB**—Mean angular velocity of inner corona was found to be 14°.11 in all heliographic latitudes, indicating that the inner corona does not share the sun's rotation. *Subject Heading:* **1. Sun's corona.**—*C.E.P.B.*

9B–72 523.73

Petri, Winfried, **Die Rotation der Sonnenkorona in verschiedenen Breiten.** [The rotation of the sun's corona in various latitudes.] *Naturwissenschaften,* 40(15):408, Aug. 1, **1953.** table, 7 refs. **DWB**—From various sources author compiles mean figures of daily sidereal rotation angle:

Heliographic latitude°	+60	+45	+30	+15	0	−15	−30	−45
Angle	13.2	13.0	13.6	14.2	14.1	14.4	14.5	13.4

Subject Heading: **1. Sun's rotation.**—*C.E.P.B.*

9B–73 523.74

Schroter, Egon Horst, **Ein Versuch zur Bestimmung des Verlaufes der magnetischen Feldstärke über die Fläche eines Sonnenfleckes.** [Attempt at a determination of the variation of magnetic field strength across the surface of a sunspot.] *Zeitschrift für Astrophysik,* 33(1):20–30, **1953.** 5 figs., 13 refs. **DLC**—A study of the magnetic field strength in the sunspot of Oct. 4, 1951 and discussion of the Evershed effect. *Subject Heading:* **1. Sunspot magnetism.**—*C.E.P.B.*

9B–74 523.77

Shaw, J. H. and Howard, J. N. (*Ohio State Univ., Columbus*), **The ozone band near 4.7μ in the solar spectrum.** *Astrophysical Journal,* Chicago, 117(3):460–461, May **1953.** table, foot-refs. **DLC**—Measurements made in the 4–5μ region of the infrared solar spectrum, with considerably higher resolution than has been done before, are reported to have revealed many previously unidentified weak lines. These are attributed to atmospheric ozone. This interpretation is claimed to have been confirmed in laboratory measurements. Attention is called to the fact that "the presence of this ozone absorption precludes the identification of any of the lines of solar CO which have been predicted to lie in this region." *Subject Headings:* **1. Solar spectrum 2. Infrared absorption spectrum 3. Ozone absorption.**—*G.T.*

9B–75 523.75:535.51

Thiessen, G., **Der Effekt der interstellaren Polarisation in der Sonnenkorona.** [The effect of interstellar polarization in the sun's corona.] *Zeitschrift für Astrophysik*, 32(3):173–184, **1953.** table, 26 refs., 9 eqs. **DLC**—It is shown qualitatively that a polarization effect is to be expected in the Fraunhofer component of the sun's corona, analogous to interstellar polarization by long dust particles partly oriented in space. This is considered to be an effect of the sun's magnetic field and is another argument for the existence of such a field surrounding the sun. *Subject Headings:* **1. Sun's corona 2. Sun's magnetic field 3. Polarization.**—*C.E.P.B.*

9B–76 523.746

Thiessen, G., **Die magnetische Feldstärke in Sonnenflecken.** [The magnetic field strength in sunspots.] *Naturwissenschaften*, 40(7):218–219, April 1, **1953.** 7 refs., 2 eqs. **DWB**—W. Mattig's equations of field strength and magnetic flux are based on a false interpretation of the observations and J. W. Broxon's 1942 expressions should be retained. *Subject Heading:* **1. Sunspot magnetism.**—*C.E.P.B.*

9B–77 523.75

Waldmeier, M., **Synthese der Sonnenkorona.** [Synthesis of the sun's corona.] *Zeitschrift für Astrophysik*, 31(4):304–315, **1953.** 2 figs., 3 tables. 13 refs., 14 eqs. English summary p. 304. **DLC**—This is the first attempt to calculate the intensities of the coronal emission lines 5303 and 6374 Å along the sun's limb. The observational data for the continuous emission are taken from the photometric records obtained during the eclipse of July 9, 1945, and those for the line emissions from observations at the Arosa Astrophysical Observatory on the day of the eclipse. The results appear to indicate that the distribution of the electrons in the corona shows large irregularities and is sometimes far from the generally accepted spherical distribution. *Subject Headings:* **1. Sun's corona 2. Coronal emission intensities.**—*From author's abstract.*

9B–78 523.755:522.9

Warwick, James W., **Reduction of measured coronal intensities to true intensities.** Harvard Univ. Observatory. Solar Dept., Contract AF 19(605)-146, Scientific Report, No. 5, March 24, **1953.** 16 p. 6 graphs, foot-refs., eqs. **DWB**—Evidence is presented which shows that the Sacramento Peak coronal intensity data contains a serious photometric error due to the neglect of the threshold effect. This effect is a consequence of the failure of the sum of two photographic densities (the density of the measuring wedge and the density of the scattered continuum of the coronal plate) to equal the density produced by the sum of the corresponding two intensity of sky-plus-instrumental scattered light. Two methods of eliminating the effect are described. The methods represent the extremes within which the proper correction technique must lie. It is shown that each of the two methods yields essentially the same corrected intensity. It is therefore immaterial which is finally adopted for reduction of our data. The report concludes with six recommendations for the improvement of our coronal photometry scheme. *Subject Headings:* **1. Sun's corona 2. Coronal emission intensities.**—*Author's abstract.*

9B–79 523.71:518.3

Wolbach, John G., **A nomographic determination of the latitude of a point on the sun's limb.** Harvard Univ. Observatory. Solar Dept., Contract AF 19(604)-146, Scientific Report, No. 7, May 22, **1953.** 4 p. fig., chart, eqs. **DWB**—The nomogram presented in this report is applicable to the problem of transforming the observed position angle of some features observed on the solar limb into heliographic latitude, for different days of the year. The derivation and use of the nomogram are outlined in the text. *Subject Headings:* **1. Heliographic latitude 2. Nonograms.**—*Partly from author's abstract.*

9B–80 523.75

Yü, Ching-Sung, **On the sources of errors affecting observations and measurements of corona line intensities.** Harvard Univ. Observatory. Solar Dept., Contract AF 19(604)-146, Scientific Report, No. 6, May 22, **1953.** 33 p. 9 figs., 12 refs. **DWB**—Solar coronal observations have important research significance in fields ranging from cosmic ray changes to radio phenomena and meteorology. Both Climax and the Sacramento Peak station have been regularly obtaining and supplying the data on coronal line intensity. The coronograph, the special instrument employed, is briefly described, and the methods of observation and visual reduction are presented. A number of sources of errors affecting the accuracy of the observations and measurements are discussed. They arise principally from atmospheric, instrumental, photographic, measurement, and solar origins. Some of these can be corrected, a few are awaiting investigation, while most of them are under control, or found to be unimportant and negligible within the present state of accuracy achieved. In spite of these uncertainties, the coronal intensities are found to be of significance. While the

present method of observation and reduction is still far from the ideal quantitative procedure desired, it nevertheless represents an efficient and quick system of obtaining uniform and fairly accurate results. *Subject Headings:* **1. Coronal emission intensities 2. Coronographs.**—*Author's abstract.*

1954

9B–81 523.7(09)

Abetti, G. (*Honorary Dir., Arcetri Obs.*), **Histoire et problèmes de la physique solaire.** [History and problems of solar physics.] *Ciel de Terre*, Uccle, 70(5/6):161–174, May/June **1954.** 6 figs. **DLC**—A concise and informative history of the development of solar physics since 1609 (invention of the telescope) to our own day. Beginning with GABLER's observations of sunspots, the author cites the various important subsequent studies of this problem and the individuals who have made signal contributions, studies on solar protuberances, spectroheliographic investigations, the chromosphere, solar storms, etc. *Subject Headings:* **1. Solar physics 2. History of solar physics 3. Chromosphere.**—*I.L.D.*

9B–82 550.385:523.74

Becker, Udo and Denisse, Jean François, **Controls of geomagnetic activity by sunspots.** *Journal of Atmospheric and Terrestrial Physics*, 5(1):70–72, March **1954.** fig., table, 4 refs. **MH-BH**—Mean values of magnetic activity C for 5 days before to 8 days after central meridian passage of sunspots are plotted for sunspots emitting strong radio noise (R spots) and quiet (Q) spots. R give a peak and Q a trough after 2–3 days. After passage of symmetrical pairs of R, peak is small; after symmetrical pairs of Q trough is deepest. *Subject Headings:* **1. Magnetic disturbances 2. Sunspot effects.**—*C.E.P.B.*

9B–83 550.385:523.75

Bell, Barbara and Glazer, Harold (*Harvard College, Obs.*), **Geomagnetism and the emission-line corona.** *Journal of Geophysical Research*, 59(4):551–553, Dec. **1954.** 2 figs., 5 refs. **DWB.** Also issued as: Harvard Univ. Observatory. Solar Dept., Contract AF 19(604)-146, Scientific Report, No. 17, July 1, **1954.** 67+4 p. 22 figs., tables, 28 refs.—Studying the onset dates of 58 recurrent geomagnetic storms from 9 sequences (1950–1953) and computing the average value of the 5303 Å intensity index across the face of the sun, it was found that the onset of such storms tends to be associated with regions of weak 5303 Å corona which have passed the east limb 8–9 days previously, and that *M*-storms are associated with regions of unusually weak 5303 Å intensity located on the same side of the solar equator as the earth. Also the semi-annual period of geomagnetic activity can best be explained by an axial hypothesis. *Subject Headings:* **1. Geomagnetic storms 2. Solar-geomagnetic relationships 3. Coronal emission intensities.**—*M.R.*

9B–84 523.72

Böhm-Vitense, Erika, **Der Aufbau der Sternatmosphären.** [The structure of stellar atmospheres.] *Umschau*, 54(13):385–387, July 1, **1954.** 5 figs. **DWB**—Spectra at points between center and limb of sun's disk indicate a decrease of temperature from interior outwards. Fraunhofer lines give surface temperature as 3800°K, continuous spectrum from a few hundred km deep about 6000°. Empirical curve of temperature against pressure (from about 300 to 10,000 atmospheres) agrees with theoretical curve calculated from transport of energy by radiation and convection. *Subject Heading:* **1. Solar atmosphere.**—*C.E.P.B.*

9B–85 523.7

Brahde, Rolf, **Tårnteleskopet.** [The tower telescope.] *Naturen*, Bergen, 78(7):215–224, **1954.** 6 figs. **DWB**—Vertical constructions rather than horizontal are preferred for solar observations. The tower-telescope at Harestua (near Oslo, Norway) is equipped with modern instrumentation which is described in some detail. The sun pictures can be taken at 26 cm diameter by the off-axis systems. The "Cassegrain" mirror system gives 24 cm diameter sun pictures and the Newton system 8.4 cm diameter pictures. The latter is a picture of the entire sun. All systems are used at Harestua. *Subject Headings:* **1. Solar observatories 2. Tower telescopes.**—*W.N.*

9B–86 523.74

Bruzek, Anton, **Die hypothetische Neigung der Sonnenfleckenachsen.** [The hypothetical inclination of sunspot axes.] *Zeitschrift für Astrophysik*, 33(4):267–273, **1954.** 4 figs., table, 9 refs. **DLC**—The distribution of sunspots about the central meridian of the visible solar disk in 1889–1943 gives no support to the assumption of asymmetry. The asymmetry of persistent spots reported by MRS. MAUNDERS was due to selection, and is not shown by older individual spots. The statistically confirmed asymmetry of the groups is not due to a general W inclination of the spot axes. *Subject Heading:* **1. Sunspots.**—*C.E.P.B.*

9B–87 523.7:77

Cooper, Robert H., **Report of tests of a hot-wire prism-guider system.** Colorado. Univ. High Altitude Observatory, Climax, Contract AF 19(604)-610, Scientific Report, No. 1, **1954.** 5 p. 5 figs., 4 graphs. **MH-BH**—This report describes the tests used and the results obtained in the testing of a device designed to produce small motions or rotations. The device consists of a pair of small diameter resistance wires which are electrically heated. In heating, the wires lengthen and produce small, controllable changes in the location of the ends of the wires. Rotational motions greater than 30 min of arc are produced. Stability to less than 1 sec. of arc is easily obtainable for use on coronograph. *Subject Heading:* **1. Coronographs.**—*Author's abstract.*

9B–88 523.72

de Jager, C., **High-energy microturbulence in the solar photosphere.** *Nature*, London, 173(4406):680–681, April 10, **1954.** 2 figs., 2 refs. **DWB**—Widening of hydrogen lines in the solar spectrum is attributed to microturbulence in the photosphere. Two models were examined, one consisting of numerous fine vertical columns at different temperatures, each ray passing through only one column, and one in which the photosphere consists of many small volume elements, half at one and half at a different temperature, distributed at random. The calculated temperature difference is 850° for the first and 1000° for the second model. *Subject Heading:* **1. Solar atmosphere.** —*C.E.P.B.*

9B–89 523.75

Dolder, Frederick P.; Roberts, W. O. and Billing, D. E. (*High Altitude Obs., Boulder, Colo.,*) **Active region prominences and the yellow coronal line.** *Astrophysical Journal*, 120(1):112–117, July **1954.** 2 tables, refs. **DWB**—Regions of the sun characterized by emission of the rarely observed coronal line λ 5694 were found to be positively associated with the following characteristic behavior of prominences at the same location: (*a*) large numbers of associated surge-type prominences; (*b*) predominance of scattered knots; (*c*) formation of continuous streamers; (*d*) downward motion of knots and streamers toward an active center, and (*e*) sharp curvatures and focusing effects in trajectories. On the other hand, the principal observed characteristics of quiescent solar prominences were found to be negatively associated with the regions of yellow coronal-line emission. *Subject Headings:* **1. Solar prominences 2. Coronal emission lines.**—*Authors' abstract.*

9B–90 523.7

*Ganguly, S. R. (*Kodaikanal Obs.*), **Altitude and azimuth of the sun.** *Indian Journal of Meteorology and Geophysics*, 5(1):70–76, Jan. **1954.** 6 figs. **DLC**—Nomograms presented for determining equation of time and the altitude and azimuth of the sun at 0600 and 1800, 0900 and 1500, and at 1200 local time on any day in the year and the times of rising and setting of the sun and planets at Kodaikanal (India) Observatory for 1954. *Subject Headings:* **1. Astronomical data 2. Sun nomograms 3. Kodaikanal, India.**—*M.R.*

9B–91 523.75

Glazer, Harold and Bell, Barbara, **Effect of plate threshold on apparent intensities of coronal lines.** Harvard Univ. Observatory, Contract AF 19(604)-146, Scientific Report, No. 18, July 28, **1954.** 10 p. 3 tables, 7 refs., 8 eqs. Mimeo. **MH-BH**—In this report, we present a summary of efforts we have made to correct the coronal indices (the average of the five maximum intensities for λ 5303, the average of the three maximum intensities for λ 6374) for errors introduced by variations in plate threshold. This work was done primarily to obtain, for use in other statistical analyses, a more accurate measure of daily coronal activity than that given by the uncorrected indices. The correction factors were obtained by the method of least squares, from indices for common observing days at Sacramento Peak and Climax. When we corrected the green line indices by the equations: $S' = S + 0.92(T_s - 5)$ and $C' = C + 0.63(T_c - 5)$, where S' and C' are the corrected indices, S and C are the uncorrected indices, and T_s and T_c are the plate threshold readings at Sacramento Peak and Climax, respectively, we significantly increased the correlation coefficients and decreased the scatter of the common daily indices about the regression lines in comparison with the uncorrected data. We also present tables of correction factors which deviate slightly from the strictly additive model. When we corrected the red line indices by the factors 0.48 and 0.43 for Sacramento Peak and Climax, respectively, we increased significantly the correlation between the red line indices from the two stations. *Subject Headings:* **1. Coronal emission intensities 2. Coronal indexes.**—*Authors' abstract.*

9B–92 523.75

*Godoli, G., **Numeri caratteristici dei flocculi d'idrogeno e di calcio e dei filamenti d'idrogeno per l'anno 1953.** [Characteristic number of hydrogen and calcium flocculi and of hydrogen filaments for 1953.] *Annali di Geofisica*, Rome, 7(1):135–139, Jan. **1954.** 2 refs., tables. Italian and English summaries p. 139. **DLC**—Data for each day in 1953 when bright and dark H_α flocculi and Ca

flocculi were observed at the solar observatory at Arcetri are presented in 3 tables, with monthly means of each compared. *Subject Headings:* **1. Solar disturbance data 2. Arcetri Astrophysical Observatory, Italy.**—*M.R.*

9B–93 523.77

Goldberg, Leo; Dodson, Helen W. and Müller, Edith A., **The width of $H\alpha$ in solar flares.** *Astrophysical Journal*, 120(1):83–93, July **1954.** 4 figs., 2 tables, refs. **DLC**—It is shown that the observed large widening, at or near maximum, of the $H\alpha$ emission line in certain solar flares can be explained as a consequence of radiation damping and the high abundance of two-quantum H atoms in the line of sight. When the effective width of the $H\alpha$ line is calculated according to the theory of self-absorption, the assumption of radiation damping leads to agreement with the observed lines widths when the number of two-quantum H atoms lies in the approximate range 10^{15}–10^{16} per cm^2 in the line of sight. If it is assumed that the lateral extension of a flare is large compared with its thickness, the theory predicts that the effective width of $H\alpha$ should be proportional to the square root of sec θ, where θ is the angular distance from the center of the solar disk. Study of the $H\alpha$ line widths of 610 flares reported in the *Quarterly Bulletin* of the I.A.U. for the period of Jan., **1949,** through June, **1952,** reveals that the average line width increases steadily with increasing central meridian distance of the flares. Furthermore, flares with exceptionally wide lines ($\geq$4.0 A) are observed most often in flares 45° or more from the central meridian. The relation between effective line width and central intensity found by Ellison is explained as primarily a consequence of self-absorption. Finally, the existing observational evidence in favor of the Stark effect as an important cause of the line broadening is examined and found unconvincing. *Subject Headings:* **1. Solar flares 2. Hydrogen lines.**—*Authors' abstract.*

9B–94 523.2:523.1

Layzer, David, **Is the origin of the solar system connected with the overall structure of the universe?** Harvard Univ. Observatory. Solar Dept., Contract AF 19(604)-146, Scientific Report, No. 15, Jan. 27, **1954.** 6 p. **DWB**—This paper describes some recent theoretical work on gravitational clustering and discusses the implications of the theory of gravitational clustering for theories of the origin of the solar system. The material contained in this report was originally presented at the symposium "Contributions to the Structure of the Universe" at the Ninetieth Meeting of the American Astronomical Society, December 1953. *Subject Headings:* **1. Origin of solar system 2. Structure of the universe.**—*Author's abstract.*

9B–95 523.74

†Link, F., **Asymétrie est-ouest de l'activité solaire.** [East-west asymmetry of solar activity.] *International Council of Scientific Unions, Brussels, Eighth Report of the Commission for the Study of Solar and Terrestrial Relationships.* Paris, **1954.** p. 35–45. tables, fig., 34 refs. **DWB**—The eastern half of the sun's disk seen from the earth is more active than the western half. This applies to sunspots, groups, and types, chromospheric eruptions, etc. Statistical tests show that the asymmetry is very probably real. Explanations discussed are the effect of evolution and inclination on visibility, and the inhibiting effect of the earth. The former is rejected and the latter supported. *Subject Heading:* **1. Solar activity.**—*C.E.P.B.*

9B–96 523.75

Malurkar, S. L., **The solar flare effect at Alibag on June 13th, 1951.** *Annali di Geofisica*, 7(2):215–219, April **1954.** fig., 3 tables. **DLC**—A detailed study of the quick-run magnetograms of the solar flare of June 13, 1951. Alibag was favorably situated. Corresponding to different flares on that day the profile of the solar flare effect has two-stage maximum. The time of the onset of the radio fade-out in relation to the flare has been pointed out. In the vertical force effect corresponding to the onset and end of radio fade-out there has been a temporary no-variation-with-time stage or a sort of inflexion. The diurnal range of ozone at Tromsø also was abnormally large within the next 24 hours. *Subject Headings:* **1. Solar flares 2. Alibag, India.**—*Author's abstract.*

9B–97 550.385:523.74

Newton, H. W. and Milsom, A. S. (*Royal Greenwich Observatory, Sussex, Eng.*), **The distribution of great and small geomagnetic storms in the sunspot cycle.** *Journal of Geophysical Research*, 59(2):203–214, June **1954.** 4 figs., 2 tables, 16 refs. **MH-BH**—The distribution of (1) great geomagnetic storms, (2) small storms with "sudden commencement" (SC), and (3) small non-SC storms through the sunspot cycle are examined. There is a close accordance between the averaged sunspot curve for the past seven cycles and the averaged curve for geomagnetic storms (1) and (2), which is shared by the giant sunspots, solar flares of greatest magnitude, and notable auroral displays. For the small non-SC storms, the distribution within the sunspot cycle and also the extent of the

relationship with sunspots at storm onset differ from those of the previous phenomena. The broad division of small storms according to the SC criterion appears to be of intrinsic significance (probably related to their solar origin), since this division is supported by the differences found in (1) distribution in the sunspot cycle, (2) relation to sunspots, and (3) characteristics (in addition to the SC criterion), including a statistical difference in the tendency to recur at intervals of a synoptic rotation (27 days), as announced by E. and O. THELLIER in 1948 and confirmed in the present paper. The Greenwich analysis of 1928, showing the statistical non-recurrence of great storms, is brought up to date. *Subject Headings:* **1. Magnetic storms 2. Sunspot cycles 3. Sudden commencements.** —*Authors' abstract.*

9B–98 523.75

Piddington, J. H. (*Australian Sci. and Industrial Res. Org.*), **Model solar chromospheres.** *Astrophysical Journal*, Chicago, 119(3):531–540, May **1954.** 3 figs., 24 refs. **DWB**—Nine different model solar chromospheres have been proposed during the last six years. The data on which these are based are indicated and the models discussed. Reasons are given for rejecting most of the models as either theoretically unsound or inconsistent with too many observational data. The most promising model seems to be one based entirely on a combination of optical and radio measurements. A corresponding model for sunspot minimum conditions is obtained from extrapolated radio data. *Subject Heading:* **1. Chromosphere models.**—*Author's abstract.*

9B–99 523.741

Plaskett, H. H., **Motions in the sun at the photospheric level, Pt. 5, Velocities of granules and of other localized regions.** *Royal Astronomical Society, Monthly Notices*, 114(2):251–270, **1954.** 5 figs., 6 tables, 16 refs., 9 eqs. **DWB**—Velocities and surface brightness in three Oxford spectra, showing granulation, have been measured. The results are in good agreement with those earlier found by RICHARDSON and SCHWARZSCHILD in a Mount Wilson spectrum. In two of the three Oxford spectra a significant correlation coefficient of $r = -0.28$ has been found between the surface brightness and the sight-line component of the velocity, showing that the bright granular matter is moving vertically upwards. Assuming that the top of the granulation zone occurs at an optical depth of unity, 0.75 km sec^{-1} is a lower limit to the velocity of ascent of the bright granular matter. The smallness, or in one spectrum the absence, of any correlation between surface brightness and velocity suggests that the granular velocities are being partially or completely masked by some other perturbation of velocity. Removing from the observed velocities that part due to granulation, the perturbing velocities are found to originate in an oscillatory velocity field with an average period of 5″ of arc and an ampliture of the order of 0.5 km sec^{-1}. *Subject Headings:* **1. Solar physics 2. Photosphere.**—*Author's abstract.*

9B–100 551.501.8:522 523.7

Ringnes, Truls S., **Astronomiske begivenheter i 1953.** [Astronomical events in 1953.] *Naturen*, 78(14):418–429, **1954.** 10 figs. **DLC**—The 11 progressive events which HARLOW SHAPLEY (*Harvard Observatory*) considers significant are summarized and discussed briefly: (1) establishment of the National Astronomical Observatory in the U. S., (2) construction of the world's largest radio telescope at Jodrell Bank, Eng., (3) electronic enlarger as developed by A. LALLEMAND and M. DUCHESNE (France) and (4) the hypersensitive photometer as developed by W. A. BAUM. (5) Radioastronomic research into the Magellanic Cloud by F. J. KERR and J. V. HINDMAN (*Radiophysics Laboratory, Sydney, Australia*). This research shows a turbulent movement around a joint center of gravity at a relative speed of 45 km/sec. The cloud masses of the large and the small clouds contain 10% and 3% water vapor, respectively. The other subjects are: (6) revision of the extragalactic scale of distance, (7) asteroidal light curves, (8) F-corona and the zodiacal light, (9) relativistic gas dynamics, (10) Lyman-alpha line in the solar spectrum and (11) new method for determining the electron density in the solar corona as a function of dispersion of radio waves from irregular structure in the upper regions. *Subject Headings:* **1. Astronomical observatories 2. Radio astronomy observations.**—*W.N.*

9B–101 522.4:523.7

†Roberts, Walter Orr, **New methods and instruments of solar observations.** *International Council of Scientific Unions, Brussels, Eighth Report of the Commission for the Study of Solar and Terrestrial Relationships.* Paris, **1954.** p. 11–23. 38 refs. **DWB**—This report describes applications of electronic techniques to solar magnetographs, the coronameter, photoelectric spectrographs, etc. Optical developments include birefringent and interference filters, coronographs, heliographs and spectrographs. Reference is made to rocket instruments for solar research. *Subject Heading:* **1. Solar physics instruments.**—*C.E.P.B.*

9B–102 523.7

Thomas, Richard N., **Comment on the solar granulation.** Harvard Univ. Observatory. Solar Dept., Contract AF 19(604)-146, Scientific Report, No. 16, Jan. 29, 1954. 10 p. fig., 19 refs. **DWB**—The interpretation of the Frenkiel-Richardson-Schwarzschild granulation studies is discussed. It is concluded that the 15,000 km pattern shown by the velocity correlation analysis establishes the existence of a convection pattern with this characteristic diameter. It is suggested that the granules themselves are sound waves, and the limitation in observed granule size reflects the atmospheric acoustic opacity. *Subject Heading:* **1. Solar granulation.**—*Author's abstract.*

9B–103 523.746

*U. S. Naval Observatory. **Positions, areas, and counts of sunspots, 1950–1953 [and] Solar summary for [the year].** Its *Circular*, [many numbers from] No. 17, May 4, 1950–No. 48, March 1, 1954. irreg. (monthly, quarterly, etc.) mostly tables. **DWB**—Elaborate data tables with explanations, published about 1 or 2 months after the month of quarter in question. Annual summaries are also included in series. *Subject Headings:* **1. Sunspot data. I. Day, Lucy T. II. Sawtell, Winifred.**—*M.R.*

9B–104 523.7:550.38

Von Klüber, H., **Further measurements to detect a general magnetic field of the sun.** *Royal Astronomical Society, Monthly Notices*, 114(2):242–245, 1954. 2 figs., table, 10 refs. **DWB**—The attempts made in 1949 to detect a general magnetic field of the sun by an interferometric method were continued at the Cambridge Observatories during 1950, again supposing that the field would be of dipole form, with an axis approximately coinciding with the sun's rotational axis. The results of the measurements of about 700 interference knots are shown in Fig. 1. The m.s.e. of a single point is about ±3 gauss. We conclude from these measurements that at the time of the observations, in 1950 July/Aug., such a general field must have been smaller than about 2 gauss and was not detectable by the present method. This is in agreement with the 1949 result. *Subject Heading:* **1. Sun's magnetic field.**—*Author's abstract.*

9B–105 523.755

Waldmeier, M., **Die Form der Sonnenkorona bei der Finsternis vom 25. Februar 1952.** [The shape of the sun's corona during the eclipse of Feb. 25, 1952.] *Zeitschrift für Astrophysik*, 33(4):286–290, 1954. fig., table, 4 refs. English abstract p. 286. **DLC**—Isophotes of the corona up to 8 solar radii from the center were constructed from a number of photos. Ellipticity increased from 0.07 at 1.16 radii to 0.235 at 1.8, decreased to 0.093 at 4.5 radii, and then increased again. The latter increase (not found by J. M. Ramberg in 1945) supports the view that the outer corona is part of the zodiacal light. *Subject Heading:* **1. Sun's corona.**—*C.E.P.B.*

9B–106 523.755:523.72

Waldmeier, M., **Simultane Bestimmung von Elektronendichte und Temperatur in der Sonnenkorona.** [Simultaneous estimation of electron density and temperature in the sun's corona.] *Zürich. Eidgenössische Sternwarte, Astronomische Mitteilungen*, No. 188, 1954. 4 figs., 3 tables, 8 refs., 6 eqs. **DWB.** Reprint from *Zeitschrift für Astrophysik*, 35:95–103, 1954. **DLC**—From the intensities of the corona lines 5303 and 6374 Å of Fe XIV and Fe X electron density and temperature have been calculated as functions of heliographic latitude both for the maximum-year 1947 as well as for the minimum-year 1953. The electron density shows its largest values over the sunspot zone and diminishes towards the poles. Secondary maxima are found over the polar zone of coronal activity. At sunspot maximum the electron density is roughly twice that at sunspot minimum. The temperature again shows maxima over the main and the polar zone of activity; its value is about 50,000° higher at sunspot maximum than at minimum. *Subject Headings:* **1. Sun's corona 2. Solar electronic density 3. Solar temperature.**—*Author's abstract.*

9B–107 523.75

Werner, Alma (*Melbourne Univ.*), **Continuous radiative absorption cross section of Fe XIV and the coronal temperature.** *Australian Journal of Physics*, Melbourne, 7(1):25–29, March 1954. 2 tables, 5 refs., 6 eqs. **DWB**—The continuous radiative absorption cross section of Fe XIV was calculated, using a Hartree wave function to evaluate the matrix element for recombination to the ground state. This matrix element was considerably smaller than the value obtained by Hill (1950, 1951) using the hydrogen-like approximation, but the total cross section for recombination was not greatly different. Balancing the rates of recombination and collision ionization in the solar corona then gave a temperature of about 2×10^{6}°K, compared with Hill's value of 1×10^{6}°K. *Subject Headings:* **1. Sun's corona 2. Solar spectroscopy 3. Solar temperature.**—*Author's abstract.*

9B–108 523.74

Whittle, P. (*Univ. Inst. of Statistics, Uppsala, Sweden*), **A statistical investigation of sunspot observations with special reference to H. Alfvén's sunspot model.** *Astrophysical Journal*, 120(2): 251–260, Sept. **1954.** fig., 5 tables, refs., 18 eqs. **DLC**—After a brief account of the properties of the autoregressive scheme, a double autoregression is fitted to the observed sunspot intensities in the northern and southern solar hemispheres. The results obtained confirm H. ALFVÉN's theory of sunspot generation and give evidence of a number of new phenomena. *Subject Headings:* **1. Sunspot observation 2. Alfvén's sunspot model 3. Alfvén's theory.**—*Author's abstract.*

9B–109 523.77

Wilson, N. L.; Tousey, R.; Purcell, J. D.; Johnson, F. S. and Moore, C. E., **A revised analysis of the solar spectrum from 2990 to 2635 A.** *Astrophysical Journal*, Chicago, 119(3):590–612, May **1954.** 3 figs., 2 tables, refs. **DWB**—New solar spectra from 2990 to 2635 A, obtained from spectrographs flown in rockets on Feb. 9, 1950, Sept. 3, 1952, and Dec. 15, 1952, are presented and analyzed. Lines as close as 0.3 A were observed. Nearly 500 lines are recorded and are attributed to 1054 atomic lines. The detailed spectral-intensity distribution-curve is presented instead of the customary visual-wave-length region of the rocket spectrum with the high-resolution *Utrecht Atlas* curve, after averaging the latter over appropriate wave-length intervals. *Subject Headings:* **1. Solar spectrum 2. Spectrograph rockets.**—*Authors' abstract.*

1955

9B–110 523.75:523.746

†Abbott, W. N. (*Athens Univ. and Inst. d'Astroph., Paris*), **Variations of the absolute surface brightness in the corona with the solar cycle.** *Annales d'Astrophysique*, Paris, 18(2):81–91, March April, **1955.** 7 figs., 7 tables, 10 refs. **DWB, DLC**—Photometric measurements of isophotes and of total coronal intensities during eclipses (1914–1945) were used to derive, by a method here described, the absolute surface brightness of the isophotes. On discussion certain relations appear between the mean distance, ρ_m, of the isophote to the limb and its absolute surface brightness, depending on the phase in the solar cycle. This empiric relation indicates that the ρ_m of a given absolute surface brightness varies more within a zone between $\rho_m = 1.0\ R_\odot$ and $2.0\ R_\odot$ the variation tending towards zero near the chromosphere and at $\rho_m = 3.8\ R_\odot$, which may be taken as the inner limit of the F corona. The ratio B_{max}/B_{min} (B_{max} =absolute surface brightness at maximum, and B_{min} =absolute surface brightness at minimum) varies, being maximum in the vicinity of the chromosphere and equal to unity at $\rho_m = 3.8\ R$. *Subject Headings:* **1. Sun's corona 2. Sunspot cycles.**—*Author's abstract.*

9B–111 523.755

Aly, M. K. (*Helwan Obs., Egypt*), **Preliminary note on measures of coronal emission lines observed at the total solar eclipse, Feb. 25, 1952 by B. Lyot and M. K. Aly.** *Astrophysical Journal*, 122(3):438–444, Nov. **1955.** 3 figs., 3 tables, 12 refs. **DWB, DLC**—The Egyptian mission for the total solar eclipse of Feb. 25, 1952, at Khartoum undertook this present work at the suggestion of the late BERNARD LYOT of Meudon, and carried it out jointly with M. K. ALY of Helwan. For this purpose, two spectrographs were designed for observing the coronal emission lines close to the sun's limb over the whole range of the spectrum from λ 6900 to λ 3100. A short account of the program is followed by a description of the plates obtained, and the wave-length measurements of all the coronal lines seen on the plates. In addition to most of the previously discovered emission lines observed at earlier eclipses, some thirteen new lines were observed at this eclipse. *Subject Headings:* **1. Coronal emission lines 2. Solar eclipse, Feb. 1952.**—*Author's abstract.*

9B–112 523.7:523.4

Arriaga, Nilo, **Relations between solar activity and the center of gravity of the planetary system.** *Journal of Geophysical Research*, Wash., D. C., 60(4):535–536, Dec. **1955. DLC**—By plotting the center of gravity of the planetary system from 1870–1960 (using only Jupiter, Saturn, Uranus and Neptune, since the others contribute only 1/146 of the effect) for Jan. 1 of each year, the author has reached the conclusion that all maxima of solar activity in the 90 years coincide with the times when the 3 centers of gravity are in relative conjunction with the center of the sun. Six out of 8 minima correspond to quarter periods with respect to the sun. Halfway periods are resonance periods so correspond to conjunction periods. The activity on the sun is thought to be due to tidal effects on the surface of the sun caused by gravitation from the planets. The solar cycles can be explained on the above grounds. *Subject Headings:* **1. Planetary-solar relationships 2. Sunspot cycles.**—*M.R.*

9B–113 523.75:523.78

Athay, R. G. and Roberts, W. O. (*High Altitude Obs., Boulder, Colo.*), **Coronal line intensities at the Khartoum eclipse.** *Astrophysical Journal*, Chicago, 121(1):231–240, Jan. **1955.** 3 figs., 5 tables, 20 refs., 5 eqs. **DWB**—Coronal line and continuum intensities were measured at several position angles on the limb and as a function of height above the limb on the slitless spectrograms obtained at Khartoum by the High Altitude Observatory. The lines λλ 5303, 6374, and 7892 and the continuum were measured at fifteen points around the limb. The relative line and continuum intensities around the limb showed large variations. In one active region where the emission in some lines was intense, the yellow coronal line λ 5694 was observed. In this same region the lines λ 6702 and λ 7060 were intense enough to measure, and it was found that lines of high ionization potential were at maxima in intensities, whereas lines of low ionization potential were at minima. The yellow line was at maximum in this region, confirming that it is a high-ionization-potential line. The correlation between line and continuum intensities was found to increase markedly as the ionization potential increased for the three lines studied. The correlation between line intensities was found to increase as the difference in ionization potential decreased. Intensities of λ 5303, λ 7892, and the continuum were measured as a function of height above the limb in four regions. Two of these regions were active centers, one of which showed the yellow line, two were more nearly average regions. The change of λ 7892 intensities with height in the latter two regions showed that the maximum intensity occurred below 10,000 km. Changes in the relative intensities of the two lines with height showed that in the yellow-line region the temperature decreased with height, but in the other regions the temperature increased with height. A comparison of the changes in line intensities of the changes in continuum intensities showed that the average temperature in the active regions was above the value at which the line λ 5303 has a maximum intensity, but in the two more normal regions the temperature was between the limits where the lines λ 5303 and λ 7892 have maxima. The active regions were found to be regions of high density. *Subject Headings:* **1. Coronal line intensities 2. Solar eclipse, Feb. 1952 3. Khartoum, Sudan.**—*Authors' abstract.*

9B–114 523.746

*Balli, Edibe (*Istanbul Univ. Obs.*), **Étude des variations courtes dans la fréquence des taches solaires.** [Study of short variations in the frequency of sunspots.] *Annales d'Astrophysique*, Paris, 18(2):118–126, March/April **1955.** 4 tables, 8 refs., 11 eqs. **DWB, DLC**—The existence of a systematic change in the short period variations in sunspot numbers is demonstrated, using the Gaussian law of errors, Kermack and McKendrick's method of runs (from a min. to a max. or vice versa), and Gleissberg's (1947–1953) method of sequences or runs of like algebraic sign to analyze sunspot data from 1755 to 1944. The probability of 7078 cycles of 11 years corresponding to a solar 80 year cycle is shown by these methods to be real but not marked. *Subject Headings:* **1. Sunspot cycles 2. Sequential analysis.**—*M.R.*

9B–115 523.746:550.38

*Cardus, J. O. (*Ebro Observatory*), **Nota relativa a la actividad solar y geomagnética.** [Note on the solar and geomagnetic activity.] **Jan.–March 1953.** *Revista de Geofísica*, Madrid, 12(46):140–148, April/June **1953. April/June 1953.** *Ibid.*, 12(47):217–226, July/Sept. **1953.** July/Sept. **1953.** *Ibid.*, 12(48):344–351, Oct./Dec. **1953. Oct.–Dec. 1953,** *Ibid.*, 13(49):104–112, Jan./March **1954. Oct.–Dec. 1954,** *Ibid.*, 14(53):71–80, Jan./March **1955. Oct.–Dec., 1955,** *Ibid.*, 15(57):53–64, Jan./March, **1956. DWB, DLC**—Extensive data on sunspots and geomagnetic activity with detailed comments. Correlations between solar and geomagnetic activity are analyzed. *Subject Headings:* **1. Geomagnetic data 2. Sunspot data 3. Solar influences 4. Ebro Observatory, Spain.**—*M.R.*

9B–116 523.74:778.34

Gil'varg, A. B., Distler, G. I. and Makarova, E. A., **Interferentsionnopoliarizatsionnyĭ svetofil'tr dlia *K*-linii ionizirovannogo kal'tsiia.** [Interference-polarizing light filter for the K-line of ionized calcium.] *Akademiia Nauk SSSR, Doklady*, 100(6):1067–1068, Feb. 21, **1955.** 4 figs., 4 refs. **DLC**—An interference-polarizing light filter with a comparatively high coefficient of filtration is indispensable for photographing with short exposure the active regions of the sun in the light of the *K*-line of ionized calcium (λ 3933.7) which is very intensive in the sun's spectrum. Describes the construction and operation of such a light filter based on film ultraviolet polarizers with a transparency of about 36% and a degree of polarization ~98 by λ 3933.7, developed at the Institute of Crystallography. A spectrogram of a section of the solar spectrum near λ 3933.7 photographed with and without the filter and 2 plates (0.5–1.0 sec exposure) of two protuberances, made with the filter in Aug. and Oct. 1954 at the Kuchino Observatory near Moscow, show the efficiency of the light filter. The authors point out that according to a short note published by R. Dunn in *Astronomical Journal*, 58:38, **1953,** such a filter was engineered at the Harvard Observatory. However,

this communication was not accompanied by any description of experimental results. Authors assume that this lack can be explained by the low transparency of the filter and the long time of exposure required by the instrument. *Subject Headings:* **1. Light filters 2. Solar photography.** —*A.M.P.*

9B–117 523.75

*Godoli, G. (*Osservatorio astrofisico di Arcetri—Centro di astrofisica del C.N.R., Florence*), **Numeri caratteristici dei flocculi d'idrogeno e di calcio e dei filamenti d'idrogeno per l'anno 1954.** [Characteristic numbers of hydrogen and calcium flocculi and of hydrogen filaments for 1954.] *Annali di Geofisica*, Rome, 8(3):325–329, July **1955.** tables, 3 refs. Italian and English summaries p. 329. **DWB, DLC**—Useful data in Ca, H_α bright and dark flocculi tabulated for each day of 1954 on the basis of observations at Arcetri (Florence), Italy. *Subject Headings:* **1. Solar flocculi data 2. Arcetri Geophysical Observatory, Italy.**—*M.R.*

9B–118 523.74

†Hardie, R. H. and Giclas, H. S. (*Lowell Obs.*), **The study of the variability of solar energy output from 1949 to 1954 by differential methods.** Flagstaff, Arizona. Lowell Observatory, Contract AF 19(604)–291, Scientific Report, No. 1, May **1955.** 22 p. 4 figs., 4 tables, 28 refs., eqs. **DWB**—A brief statement of the problem of measurement of possible solar variations is given. The differential method of measuring the sun's light as reflected by objects in the solar system when compared to the light from stars is outlined. Differential observations covering five years of study are presented together with the development of techniques that will yield the highest precision of observation at this time. When the results are placed on a fairly homogeneous basis, the limits of any possible solar variation over the range of wave length observed are shown to be less than one % during this period. No correlations of the small fluctuations between values of the solar constant determined by the Astrophysical Observatory of the Smithsonian Institution and these observations have been found. Older observations are also listed, but the uncertainties of placing all of these on a homogeneous basis are so large that accurate intercomparison is not possible. *Subject Headings:* **1. Solar energy variations 2. Solar energy measurement.**—*Authors' abstract.*

9B–119 523.75:535.24

Hepburn, Nannielou (*Naval Res. Lab., Wash., D. C.*), **A photometric study of the solar corona.** *Astrophysical Journal*, Chic., 122(3):445–459, Nov. **1955.** 13 figs., 2 tables, 11 refs., eqs. **DWB, DLC**—Photometric measurement of the solar corona as photographed by the Naval Research Laboratory expedition to Khartoum, Sudan, on Feb. 25, 1952, is described and related to other measurements and theoretical studies. In particular, the variation of white-light intensity with radius is compared to VAN DE HULST's model of the corona, and coefficients are derived for his equations which produce curves more nearly fitting the observed intensities. The removal of the F-corona and calculation of electron densities according to VAN DE HULST's model appears to give consistent results here. These measurements extend from the solar limb out to about 2.5 solar radii from the center of the sun, so that combination of the results with those obtained by the French expedition to Khartoum (headed by BERNARD LYOT) is of considerable interest. A comparison has been made between their measurement of the variation with the position angle of the red and green coronal lines near the great streamer and variations in the white-light corona. Although the center of the streamer appears to lie about 10° north of the emission-line maximum, an examination of the white-light corona near the limb ($\rho = 1.06$) shows a close correlation of white-light intensity with the emission lines. *Subject Headings:* **1. Sun's corona 2. Photometric observation 3. Solar eclipse, Feb. 1952.**—*Author's abstract.*

9B–120 523.746

*Jensen, E.; Nordø, J. and Ringnes, T. S., **Variations in the structure of sunspots in relation to sunspot cycle.** *Astrophysica Norvegica*, Oslo, 5(6):167–205, **1955.** 22 figs., 7 tables, 15 refs. **DWB**—Analytical results of 653 single regular sunspots $>10\times10^{-3}$ $R_\odot$ based on Greenwich observations 1878–1945 are discussed here. The mean value, q, of the ratio between the total sunspot area and the umbra area which was calculated for each year is shown to vary within wide limits but tends to follow the sunspot cycles, yet with less distinct amplitude after 1933. The established dependency of q on the mean radius, p, of the spots was tested analytically including regular spots with $p<10\times10^{-3}$ $R_\odot$. It is suggested as a rule that for a decreasing p, q passes through a minimum. *Subject Headings:* **1. Sunspots 2. Sunspot cycle.**—*W.N.*

9B–121 523.72:535.245

†Karandikar, R. V. (*Div. of Physics, Nat'l. Res. Council, Ottawa*), **Luminance of the sun.** *Optical Society of America, N. Y., Journal*, 45(6):483–488, June **1955.** 2 figs., 2 tables, 32 refs. **DLC**—Using a photoelectric telephotometer and a calibration source, drift curves of the luminance of the

sun along a diameter were obtained for different zenith distances of the sun on clear days. After extrapolation to zero air mass, the luminance B (0,0) at the center of the sun's disk observed outside the earth's atmosphere was obtained as $243{,}000 \pm 5000$ candles/cm^3. The data obtained for the radial distribution of luminance being comparatively less accurate, the standard limb darkening data of ABBOT and others were used to give the average luminance $\overline{B} = 193{,}000 \pm 4000$ candles/cm^3 and the extraterrestrial total solar illumination $\overline{E}_0 = 12{,}200 \pm 300$ lumens/ft^2 for the mean solar distance. Previous determinations of E_0 found in the literature are reviewed and compared with these results. *Subject Headings:* **1. Sun's luminance 2. Photometry.**—*Author's abstract.*

9B–122 523.72:523.755

Layzer, David, **The yellow emission line of the solar corona.** *Nature*, London, 175(4458):647–648, April 9, **1955.** fig., 7 refs. **DWB**—Confirmation that the yellow lines λ 5694 (EDLÉN) and λ 5445 (WALDMEIER) are calcium lines. *Subject Headings:* **1. Sun's corona 2. Coronal emission lines.**—*C.E.P.B.*

9B–123 523.75:550.385

Leighton, Hope I. and Billings, Donald E., **Solar H_α filaments and geomagnetic disturbances.** *Journal of Atmospheric and Terrestrial Physics*, 7(6):349–350, Dec. **1955.** fig., 4 refs. **DWB**—Dark filament areas on central solar meridian show a minimum for 2–3 days preceding geomagnetically disturbed days and a maximum preceding quiet days. *Subject Headings:* **1. Geomagnetic disturbances 2. Solar filaments.**—*C.E.P.B.*

9B–124 523.7:535.8:531.744

McCoy, D. O., **An all-weather radio sextant.** *Navigation*, Los Angeles, 4(8):309–319, Dec. **1955. DWB, DLC**—The automatic sun tracking sextant (of which three types are described and illustrated along with modus operandi outlined in simple diagram) is mainly characterized by its immunity to weather for accurate performance. Data obtained at 1.9 cm and 8.7 mm wave lengths are discussed briefly since more complete results are to be published from the experiments at Feather Ridge Observatory. Results from such experiments (1952 cases) at 8.7 mm wave length is given in a curve showing only 0.017° probable error of integral distribution for altitudes above 30°. Lunar tracking has been done experimentally, with better results than were obtained from radio stars strong enough for tracking with the radio sextant. *Subject Headings:* **1. Radio sun tracking sextant 2. Optical instruments 3. All-weather instruments.**—*W.N.*

9B–125 523.75:523.788

Matsushima, Satoshi, **Analysis of the Balmer decrement observed at the 1932 and 1952 eclipses.** *Astrophysical Journal, Supplement Series*, Chicago, 1(12):479–490, May **1955.** 4 figs., 3 tables, 5 refs., 28 eqs. Also Athay, R. G. and Thomas, R. N., **Self-absorption and the population of the second quantum level.** *Ibid.*, p. 491–504. 6 figs., 7 tables, 9 refs., 21 eqs. Also Athay, R. G.; Menzel, D. H.; Pecker, J. C. and Thomas, R. N., **Model of the chromosphere from the continuum emission.** *Ibid.*, p. 505–519. 4 figs., 7 tables, 18 refs., 33 eqs. (These are Pts. 3–5 of **Thermodynamic state of the outer solar atmosphere,** which also appeared in summary only in *Astrophysical Journal*, 121(3):775–776, May 1955). **DLC**—These 3 papers deal with the frequencies of radiation in the hydrogen spectrum of the sun as revealed in eclipse studies. MATSUSHIMA finds that "the height gradient of the population of the Balmer ground state falls below that of the higher levels . . . thus implying a significant gradient in the nonequalibrium term for the second level." In the second paper the influence of self-absorption on the higher lines ($n > 10$) is confirmed. A scale height of ~2000 km is deduced for n_2 by contrast with ~500 km for the highest quantum levels. The derived self-absorption is so large that at $H11$ only some 7% of the emission at $h \sim 1000$ km escapes from the chromosphere. The third paper determines number and temperature of electrons in the chromosphere between −120 and 6000 km: "(1) The intensity of the continuous emission of λ 4700 indicates that T_e increases with height from about 4800° at −65 km. (2) The emission, per cm^3, in the Balmer continuum attains a maximum near 500 km, which indicates that here the free electrons begin to come mainly from H rather than from metals, and thus places the limits: $5000° < T_e < 7000°$, $4 \times 10^{11} < n_e < 5 \times 10^{11}$ at this height. (3) The intensities of the continuum at λ 4700 and λ 3640 require values of T_e as follows: 5000° at 500 km, 6100° at 1000 km, and 6700° at 3000 km. In the interval 1000–3000 km the ionization of H increases from about 3 to about 80%. (4) Above 3000 km no data on the Balmer free-bound continuum exist, and an extension of the results of 3 to greater heights requires the use of the height gradient of the Balmer lines to replace that of the continuum. Such a technique fixes T_e only within certain limits, which at 600 km, are $2 \times 10_4 < T_e < 1.2 \times 10_4$." The results suggest a continuous distribution of material in the solar atmosphere below 2500 km and its breakdown above 3000 km. *Subject Headings:* **9. Solar physics 2. Eclipse phenomena 3. Balmer series.**—*C.E.P.B. and authors' abstracts.*

9B–126 522.2:523.746

Mergentaler, Jan, **Obserwacje plam słonecznych.** [Sunspot observations.] *Acta Geophysica Polonica*, Warsaw, 3(2):43–48, **1955.** fig., 3 tables, 2 refs. English summary p. 48. **DWB, DLC**—Solar observations were organized by the author in 1951. A number of amateur astronomers and three persons from the Wrocław Observatory staff made visual observations of sunspots to obtain the Wolf numbers. A table contains the results for 1953 and 1954. The daily means are given, the scale for which is adjusted to the scale of Zurich with aid of Wolf Numbers published in the **Sonnen Zircular** of Freiburg. Despite such adjustment, there remains a small systematic difference: Zurich-Wrocław = +1.9. Table 2 contains the monthly mean Wolf Numbers and the means for given years. The last ones are systematically lower than given by Zurich. As it is known from the data of Freiburg the reduction of systematical difference to zero is hardly possible. Table 3 contains the rotational means, where the rotations are calculated starting with Oh GMT Feb. 8, 1932 with the period of rotation $P = 27$ days. *Subject Headings:* **1. Sunspot observations 2. Sunspot numbers 3. Wrocław, Poland 4. Zurich, Switzerland.**—*From author's abstract.*

9B–127 550.385:523.74

Naqvi, Ali M. (*Univ. of Delhi*) and Bhargava, B. N. (*Kodaikanal Observ.*), **Recurrence tendency of geomagnetic activity during the current sunspot minimum.** *Indian Journal of Meteorology and Geophysics*, Delhi, v. 5, Spec. No.:195–202, Dec. **1954.** 3 figs., table, 14 refs. **DWB**—Geomagnetic activity during the three year period June 1950–June 1953, has been analyzed and found to consist mainly of two very long sequences of recurrent (27-day period) moderate geomagnetic storms. During the three year period there have been 40 recurrences of one of these sequences (called the A-sequence) and 21 recurrences of the other sequence (called the B-sequence). Moreover these sequences have continued beyond the period studied. Each sequence exhibits a periodic variation in its activity with a period of one year. For the A-sequence the maxima lie near Sept. and minima near March, whereas for the B-sequence the maxima lie near March and minima near Sept. The explanation for this variation is found to lie in the tilt of the solar axis of rotation to the ecliptic; the heliographic latitude of the earth attains its maximum positive and negative values on 7 Sept. and 5 March, respectively. The M-regions responsible for these long sequences are located above 7°.2 heliographic latitude and separated by about 130° in longitude. The M-region associated with the A-sequence lies in the Northern Hemisphere and the other one in the Southern Hemisphere. *Subject Headings:* **1. Geomagnetic activity 2. Sunspots.**—*Author's abstract.*

9B–128 523.746:550.38

Naqvi, Ali M. and Tandon, J. N. (*both, Univ. of Delhi*), **The very long lived *M*-regions near the sunspot minimum of 1933.** *Indian Journal of Meteorology and Geophysics*, New Delhi, 6(3):251–253, July **1955.** table, 3 refs. **DLC**—The geomagnetic activity during the years 1930–34 has been analyzed, and the earlier conclusions of Naqvi and Bhargaba for the geomagnetic activity during 1950–53 are confirmed. Three very long sequences of the recurrent type of geomagnetic activity designated as *A*, *B* and *C* have been found. The difference in the heliographic longitudes of the *M*-regions responsible for the *A* and the *B* sequence is about 180°, for the *B* and *C* sequences about 45°, and for the *C* and the *A* sequences about 135°. Their respective heliographic latitudes are: above 7°.2 M, below 7°.2 S, and about 4°.8 S, respectively. *Subject Headings:* **1. Geomagnetic activity 2. Sunspots.**—*Authors' abstract.*

9B–129 522.2:523.746

Öhman, Y. and Lodén, L. O., **Sunspot areas, flares and filaments observed at the Stockholm Observatory and at its station in Anacapri in the years 1952 and 1953.** *Tellus*, Stockholm, 7(4):501–508, Nov. **1955.** 6 tables, ref. **DWB, DLC**—Tables are presented giving sunspot areas and filaments according to the solar routine observations carried out at the Stockholm Observatory in Saltsjöbaden in 1952 and 1953. The sunspot areas are obtained from plates secured with a solar camera equipped with an ultra-violet filter, whereas indications of activity through the presence of bright Hα faculae and measures of filaments are obtained from spectroheliograms. Tables are presented also of flares observed in Saltsjöbaden and at the Swedish Solar Station on Capri. *Subject Headings:* **1. Sunspot observation 2. Solar flares 3. Saltsjöbaden, Sweden.**—*Authors' abstract.*

9B–130 523.746:523.741

Parker, Eugene N. (*Utah Univ., Physics Dept., Salt Lake City*), **The formation of sunspots from the solar toroidal field.** *Astrophysical Journal*, Chicago, 121(2):491–507, March **1955.** 4 figs., 5 refs., 66 eqs. **DLC**—It is shown that a horizontal magnetic flux tube in an electrically conducting atmosphere is buoyant and will tend to rise. This magnetic buoyancy is large enough to bring an occasional strand of flux from the general solar toroidal field up into the photosphere, if we assume general field densities of a few hundred gauss farther down. Identifying the intersection of such ropes with the photosphere as the source of sunspots, we may deduce several general characteristics

of the spots, e.g., east-west orientation, bipolarity, appearance only in low latitudes, migration, reversal of polarity, etc. The linearized static equilibrium equations from a flux tube are developed. With a cooling mechanism, such as that suggested by BIERMANN (1941), we find from the equilibrium equations that a sunspot group should consist of a diffuse flux tube of 10–100 gauss and 10^5 km extent in the photosphere, forming eventually a number of cool intense cores of several thousand gauss. *Subject Headings:* **1. Sunspot theories 2. Solar toroidal field.**—*Author's abstract.*

9B–131 523.755

Parker, James M. (*Cal. Tech.*), **The rotational temperature of the lower solar chromosphere.** *Astrophysical Journal*, Chicago, 121(3):731–738, May **1955.** 2 figs., 2 tables, 14 refs., 3 eqs. **DLC**—From spectra of the lower solar chromosphere taken outside eclipse, rotational temperatures have been derived from the (0,0) and (0,1) bands of C_2. Using the intensities of 83 lines, a rotational temperature of 4610°K was found, with a probable error of approximately 400°K. *Subject Headings:* **1. Rotational temperatures 2. Chromosphere.**—*Author's abstract.*

9B–132 551.510.4:523.722

†*Payne-Gaposchkin, Cecilia (*Harvard Col. Obs.*), **Astrophysical temperatures.** *American Institute of Physics, Temperature, its Measurement and Control in Science and Industry, Vol. 2 (Oct. 1954) Symposium*), pub. **1955.** p. 31–59. 27 tables, 115 refs. **DWB, DLC**—A number of ways in which temperatures are determined for the sun and stars are treated in separate sections of this article, and examples of values obtained by different authors by the various methods given in tables and compared and discussed. These are color temperatures, effective temperatures, brightness temperatures, excitation temperatures, ionization temperatures, kinetic temperatures, central temperatures and rotational temperatures. The absorption of energy by the earth's atmosphere, ozone, etc. presents the biggest obstacle. *Subject Headings:* **1. Stellar temperature measurement 2. Atmospheric effects on stellar astronomical observations.**—*M.R.*

9B–133 523.745:550.385

Roberts, Walter Orr and Trotter, Dorothy E., **Solar prominences and geomagnetic disturbance.** *Journal of Atmospheric and Terrestrial Physics*, 6(5):282–283, May **1955.** fig., 8 refs. **DWB**—Areas of prominences were measured for solar latitudes greater than 20° and 30° on magnetically disturbed and quiet days. No significant trends were found but mean for disturbed days was slightly below mean for quiet days. *Subject Headings:* **1. Solar bursts 2. Geomagnetic disturbances.**—*C.E.P.B.*

9B–134 523.755

Ross, L. W., **Accuracy of solar-flare observations.** *Journal of Atmospheric and Terrestrial Physics*, 7(6):344–345, Dec. **1955.** fig. **DWB**—The mean standard deviation of solar flares reported on a scale of 1–3 by 3 or more observers is 0.45 over most of the range, falling to zero at the extremes. Hence 1 and 3 are fairly reliable, and in class 2 observers are more often right than wrong. *Subject Heading:* **1. Solar flares.**—*C.E.P.B.*

9B–135 523.755

Rothschild, Kurt; Pecker, Jean-Claude and Roberts, Walter Orr (*Montana State College, High Altitude Observ.*), **The prominence of July 21, 1951.** *Astrophysical Journal*, Chicago, 121(1):224–230, Jan. **1955.** 6 figs., table, 10 refs., 2 eqs. **DWB**—The motions of 49 knots in the large prominence of July 25, 1951, have been measured. For 17 of them a definite variation of acceleration vectors has been found. The dynamics of the motion still remains obscure. It seems difficult to represent them by a coherent field of forces. Moreover, gravity seems to play no role in this prominence. *Subject Heading:* **1. Solar prominences.**—*Authors' abstract.*

9B–136 523.72:535.33

Schröter, E. H., **Zur Deutung der Rotverschiebung im Sonnenspectrum.** [The meaning of the red shift in the solar spectrum.] *Naturwissenschaften*, 42(23):623–624, Dec. 1, **1955.** fig., table, 6 refs. **DWB**—The difference between the observed red shift and that given by the relativity theory was examined with new material for various Fraunhofer lines. Some conclusions are drawn as to solar structure. *Subject Headings:* **1. Solar spectrum 2. Relativity theory.**—*C.E.P.B.*

9B–137 52:059

Sofia, Bulgaria. Astronomicheska Observatoriia ($\varphi = 42°41'02''$, $\lambda = -1^h33^m23^s,3$), **Godishnik 1955.** [Yearbook of the Sofia Observatory . . . for 1955.] Sofia, **1954.** 59 p. diagrs., numerous tables. At head of t-p: Bulgarska Akademiia na Naukite. Astronomicheska Sektsiia.—Usual data on sun, moon, planets, stars, eclipses, etc. found in a nautical almanac, for Sofia, Bulgaria. *Subject Headings:* **1. Astronomical almanacs 2. Sofia, Bulgaria.**—*M.R.*

9B–138 523.746

Troeger, Heinz, **Säkuläre Änderung im zeitlichen Abstand der Sonnenflecken-Maxima.** [Secular change in the temporal separation of sunspot maxima.] *Meteorologische Rundschau*, Berlin, 8(7/8):135–136, July/Aug. **1955.** fig. **DLC**—The intervals between sunspot maxima (as distinct from minima) have been decreasing since 1600. For the 'normal group' the decrease was from 14 to 10 years, with a jump about 1720. *Subject Heading:* **1. Sunspot cycles.**—*C.E.P.B.*

9B–139 523.74

*Trotter, Dorothy E. and Robert, Walter Orr, **1954 solar activity summary, No. 3, July 10–Sept. 30, 1954. Solar rotation Nos. 1349–1351.** *Harvard Univ. and Colorado Univ. High Altitude Observatory, Boulder and Climax, Colo., Report*, No. HAO-25, Jan. 15, **1955.** 18 p. 6 charts (fold.) "Report sponsored by the U. S. National Bureau of Standards." **DWB.** Also: **No. 4, Oct. 6–Dec. 26, 1956.** *Ibid., Report* No. HAO-36, July 15, 1957. 31 p. tables, charts (fold.). **DWB**—Data are presented in tables and extensive folded graphs, and discussed. This is the 15th and 24th in a series of quarterly solar summaries, each of which covers 3 or 4 solar rotations. Intensity of emission line of solar corona is emphasized. Observations are made with solar coronograph at Climax, Colo. Where possible auroral and geomagnetic distributions are related to active centers on solar disk. *Subject Headings:* **1. Solar-terrestrial relationships 2. Solar activity data 3. Climax, Colo.**—*M.R.*

9B–140 523.743

Uberoi, Mahinder S. (*Dept. of Aeronautical Engr., Univ. of Michigan*), **On the solar granules.** *Astrophysical Journal*, Chic., 122(3):466–476, Nov. **1955.** 6 figs., 8 refs., 19 eqs. **DWB, DLC**—The granule data are analyzed to show that all the characteristics of present-day measured solar brightness fluctuations (granules) are almost entirely determined by the instruments used to measure them. For example, the measured intensity and scale of the granules are not even close to the actual value. The analysis shows that the spectrum of the brightness fluctuations extends over a much wider range than that covered by any telescope thus far used to measure solar granules. The previous work on the subject is critically examined. It appears that, independent of the resolving power, some of the conclusions drawn by other investigators are open to objections. *Subject Heading:* **1. Solar granulation.**—*Author's abstract.*

9B–141 523.746

*Waldmeier, M., **Die Sonnenaktivität im Jahr 1950.** [Solar activity in 1950.] *Naturforschende Gesellschaft, Zürich, Vierteljahrsschrift*, 96(2):119–131, June 30, **1951.** 8 tables, 2 figs. . . . **1951.** *Ibid.*, 97(2):114–126, June 30, **1952.** 8 tables, 2 figs. . . . **1952.** *Ibid.*, 98(2):109–122, June 30, **1953.** 9 tables, 2 figs. . . . **1953.** *Ibid.*, 99(2):115–129, June 30, **1954.** 2 figs., 8 tables. . . . **1954.** *Ibid.*, 100(2):114–130, June 30, **1955.** 3 figs., 10 tables. **DWB, DLC** (Q67.Z94)—A regular annual feature of the journal, each report gives the frequency numbers of sunspots, photospheric faculae and prominences as well as the intensity of the coronal line 5303 Å, all characterizing the solar activity in the years 1950–1954. *Subject Headings:* **1. Solar activity 2. Sunspot numbers 3. Coronal emission intensities**—*A.A.*

9B–142 523.75

Warwick, James W. (*Harvard Coll. Obs.*), **Heights of solar flares.** *Astrophysical Journal*, Chicago, 121(2):376–384, March **1955.** 8 figs., 4 tables, 2 refs., 6 eqs. **DLC**—The observed area of a solar flare is a combination of two areas: the area of the sides of the flare as it would be seen at the limb and the area of the top of the flare as it would be seen at the centre of the disk. The change in measured areas of $H\alpha$ flares observed at the center of the disk and at some distance from the center of the disk is used to derive information on heights of flares. A preliminary analysis of the raw data indicates that flares are neither flat nor needle-shaped. Explicit height distributions, functions of flare area, are derived from the smoothed data. The shape assumed here for a typical flare appears to be more realistic than that proposed by Waldmeier. The height-frequency distribution is well represented by $\exp[-\beta h]$, where β is the reciprocal of 20,300 km. Flares at the limb of the sun should therefore be visible as low, but extremely bright, prominences. *Subject Headings:* **1. Solar flare heights.**—*Author's abstract.*

9B–143 523.74 550.38

Warwick, James W., **Magnetic intensification and the sunspot curve of growth.** Harvard Univ. Observatory. Solar Dept. Contract AF 19(604)-146, Scientific Report, No. 21, April 4, **1955.** p. 245–251. 4 figs., 6 refs., 15 eqs.—A parameter to measure the intensification effect of a longitudinal magnetic field on an anomalous Zeeman pattern is proposed. The parameter is justified in terms of a semi-quantitative evaluation of equivalent widths in blending components. This parameter predicts rather large differential intensification effects from line to line in the sunspot

data obtained at Potsdam (TEN BRUGGENCATE and VON KLÜBER). Since the data show no such effects, it is concluded that the sunspot spectra give evidence for a real turbulence effect, instead of a "pseudo-Doppler" effect. The turbulent velocities are of the order of 2 km/sec. *Subject Headings:* **1. Sunspots 2. Magnetic intensification 3. Turbulence effects.**—*Author's abstract.*

9B–144 523.75

*Yü, Ching-Sung, **A study of 442 solar flares observed at Sacramento Peak, N. M., from February 28, 1951 to October 31, 1953.** Harvard Univ. Observatory. Solar Dept., Contract AF 19(604)-146, Scientific Report, No. 26, July 8, **1955.** 12 p. 7 figs., 3 tables, 10 refs. **DWB**—This report embodies a study of some of the general characteristics of 442 solar flares, observed at Sacramento Peak, N. Mex., from Feb. 28, 1951 to Oct. 31, 1953. The instruments used and the methods of observation and reduction are briefly described. We present and discuss several aspects of the flare distribution. The results show: (1) that the number of flares increases with decrease in size in accordance with the known frequency distribution curve; (2) that flares tend to cluster fairly symmetrically in certain regions of the sun; (3) that flares are distributed fairly evenly in the east and west portions of the sun; (4) twice as many flares appeared in the Northern Hemisphere as in the Southern Hemisphere; (5) the distribution of the sizes of flares as a function of the distance from the center of the sun's disk, shows that no correction for foreshortening seems to be necessary, at least no correction for a flat surface, and that majority of flares are randomly shaped objects; and (6) that these flares exhibit a variation in annual activity with two maxima, one at April–May and the other at Aug.–Sept. Whether this "seasonal" effect is real or not remains to be seen. *Subject Headings:* **1. Solar flares 2. Sacramento Peak, N. Mex.**—*Author's abstract.*

1956

9B–145 523.746

Alfvén, H. (*Royal Inst. of Tech., Stockholm*), **On the theory of sunspots.** *Tellus*, Stockholm, 8(2):274–275, May **1956.** 5 refs., eqs. **DLC**—By means of a calculation, the author shows that the magnetic energy of sunspots is so large that it is unlikely that it can be supplied by the non-uniform rotation of the sun and concludes that nuclear energy released in the solar core is the most probable source of energy for sunspots. It is suggested that if heat produced deep in the solar core is converted into mechanical and magnetic-hydrodynamic energy in a convection region, the latitude dependence of solar activity is a natural result of the geometry of a general magnetic field which makes the solar matter anisotropic to magnetic-hydrodynamic waves. COWLING's objections to this hypothesis are answered. *Subject Headings:* **1. Sunspot theories 2. Sunspot energy.**—*I.L.D.*

9B–146 538.12:523.741

Alfvén, Hannes (*Royal Inst. of Technology, Stockholm*), **The sun's general magnetic field.** *Tellus*, Stockholm, 8(1):1–12, Feb. **1956.** 7 figs., 3 tables, 37 refs., 15 eqs. **DLC.** Also: Alfvén, H., and Lehnert, B., **The sun's general magnetic field.** *Nature*, London, 178(4546):1339, Dec. 15, **1956.** 3 refs., 2 eqs. **DWB**—The solar magnetic field, including the interplanetary field is discussed. It is pointed out that in the absence of a theory of the Zeeman-effect in a turbulent atmosphere it is at present impossible to derive a value of the sun's general magnetic field from spectroscopic measurements. From the magneto-hydrodynamic theory of sunspots a value of the sun's general magnetic field can be derived. ANANTHAKRISNAN's diagrams of the prominence activity can be interpreted as due to the same disturbance wave as is causing the sunspots. This gives further confirmation to the theory, which indicates magnetic field of $H_p = 12$ gauss. The magnetic field outside the sun (interplanetary field) is certainly far from a dipole field. An approximate model of the field is tentatively suggested. This model is in agreement with information derived from cosmic ray and magnetic storm data and is also reconcilable with the coronal ray structure. *Subject Headings:* **1. Magnetohydrodynamic theory 2. Solar magnetism of sunspots.**—*Author's abstract.*

9B–147 523.7:538.12

Babcock, Horace W., **The sun's general magnetic field.** *Nature*, London, 178(4532):533, Sept. 8, **1956.** 7 refs. **DWB**—The view of H. ALFVÉN (*see* 9B–146) that it is impossible to derive a value of the sun's magnetic field is criticized. There is no reason to doubt the observations of weak fields (about 1 gauss), positive near the North Pole and negative near the South Pole. *Subject Heading:* **1. Sun's magnetic field.**—*C.E.P.B.*

9B–148 523.75

Becker, Udo, **Ein bemerkenswerter Filamentaufstieg.** [A remarkable filament eruption.] *Naturwissenschaften*, 43(18):417, Sept. 15, **1956.** fig. **DWB**—Five sketches of a filament and faculae observed at Freiburg on April 24, 1956, between 6 h 26 and 7 h 50. *Subject Headings:* **1. Solar eruptions 2. Freiburg, Germany.**—*C.E.P.B.*

9B–149 523.75:550.38

Bell, Barbara and Glazer, Harold (*both, Harvard Coll. Obs.*), **Geomagnetism and the emission-line corona.** *Journal of Geophysical Research*, Wash., D. C., 61(2, Pt. 1):179–182, June **1956.** 2 figs., 5 refs. **DLC**—This paper summarizes the results of an extensive investigation of the relation between Kp and the intensity of the emission-line corona. We consider the coronal intensity in the northern and the southern solar hemispheres separately, and find that the intensity in the hemisphere on the same side of the solar equator as the earth shows the closer relation to Kp. We discuss the identification of M-regions with areas of unusually weak 5303 corona. *Subject Headings:* **1. Coronal emission intensities 2. Geomagnetic effects.**—*Authors' abstract.*

9B–150 551.521.63:523.72

de Jager, C. (*Sterrenwacht Sonnenborgh, Utrecht*), **The distribution of Ly-α radiation over the solar disk.** (In: **Solar eclipses and the ionosphere: a symposium . . .** ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 174–179. 2 figs., 13 refs.) **DWB**—The minimum intensity of the Ly-α line, measured with the rocket technique, yields a radiation temperature of 6800° for the center of the line. The corresponding electron temperature of the chromosphere is 66,000°±10,000°; this temperature prevails in the layers about 95 km above the photosphere. The variation of intensity of the Ly-α line over the disk is computed and compared with the observations. A qualitative discussion of the enhanced Ly-α radiation in plages and flares is given. *Subject Headings:* **1. Ultraviolet radiation distribution 2. Solar temperature.**—*Author's abstract.*

9B–151 537.531:551.510.535

Elwert, G. (*Astronomical Inst., Tübingen Univ.*), **The X-ray radiation of the solar corona and hot coronal condensations.** (In: **Solar eclipses and the ionosphere: a symposium . . .** ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 167–173. 5 figs., ref.) **DWB**—In earlier papers of the author, the soft X-ray radiation of the undisturbed sun was calculated and its effect on the atmosphere of the earth discussed. It is shown that this radiation could explain the formation of the normal E layer. The calculated height and thickness as well as the electron density in the case of equilibrium between ionization and recombination are in accord with the observed data. This theory has been extended by calculations of the thermal radiation of coronal condensations, which are generally believed to be the origin of the slowly varying component of the radio emission of the sun. The radiation of the condensations was calculated assuming electron densities as derived by Waldmeier and Müller and temperatures of several million degrees as postulated by Waldmeier, Piddington, and Minnett. We find a remarkable increase of the X-ray radiation below about 20 A and a short-wavelength limit in the neighborhood of 7 A. These results are in agreement with observations of the X-ray radiation by rocket exploration. *Subject Headings:* **1. X-radiation 2. Ionospheric electron density 3. Coronal condensations.**—*Author's abstract.*

9B–152 523.746

Gleissberg, W., **Zur Konstanz der Skala der Sonnenfleckenrelativzahlen.** [Constancy of sunspot relative numbers.] *Naturwissenschaften*, Berlin, 43(9):196, May 1, **1956.** 4 refs. **DWB**—Number of eruptions, protuberances, etc. in 1944–54 was less than expected from sunspot number. From Greenwich data 1878–1953 author concludes that 16.7 as the ratio of daily sums of spot areas to relative number is too high, that the ratio increases with increasing spot number, but that there is no evidence of a change in the scale of sunspot numbers. *Subject Heading:* **1. Sunspot relative numbers.**—*C.E.P.B.*

9B–153 523.75

Bullon, E., **Protuberancias solares: resumen de las observaciones realizadas en el Observatorio de Madrid durante el año 1955. Altura de la cromosfera en el mismo año.** [Solar protuberances: resume of observations at the Madrid Observatory, 1955, and the height of the chromosphere in the same year.] *Urania*, Barcelona, 41(243):83–88, April/June **1956.** figs., tables. **DWB, DLC**—Data in tables and drawing showing frequency of protuberances in each 5° zone of the sun and discussion of data. *Subject Headings:* **1. Solar flares data 2. Madrid Observatory, Spain.**—*M.R.*

9B–154 535.33

Karimov, M. G. and Moroz, V. I. (*Astrophysical Inst. Akad. Sci. Kazakh SSSR*), **Fotoelektricheskaia registratisiia emissionnoĭ linii solnechnoĭ korony λ 5303 Å posredstvom spektrometra na vnezatmennom koronografe.** [Photoelectric recording of the 5303 Å emission line of the solar corona by means of a spectrometer on an uneclipsed coronograph.] *Akademiia Nauk SSSR, Doklady*, 109(3):469–471, July 21, **1956.** 2 figs., 7 refs. **DLC**—The authors describe, with the aid of a diagram, the construction of an experimental model of a photoelectric spectrometer which V. I. Moroz first constructed by adding a photoelectric attachment to a diffraction spectrograph

of an uneclipsed coronograph and transforming it into an automatic photoelectric spectrometer. A record obtained with this instrument is reproduced showing, in addition to the 5303 Å line, the Fraunhofer lines of scattered light on the basis of which a definite identification of the green emission line of the corona is made. *Subject Heading:* **1. Photoelectric spectrometers.**—*I.L.D.*

9B–155 535.33:523.77

McMath, Robert R. (*McMath-Hulbert Obs., Univ. Michigan*), **Solar spectroscopy with a vacuum spectrograph.** *Astrophysical Journal*, Chicago, 123(1):1–8, Jan. **1956.** 10 figs. (incl. photos), 2 tables, 5 refs. **DWB, DLC**—The vacuum spectrograph and its advantages are described and equipment and results illustrated. Among these advantages is the elimination of refraction due to air motion within the instrument. *Subject Headings:* **1. Solar spectroscopy 2. Vacuum spectrographs.**—*M.R.*

9B–156 523.75

Ryle, M. (*Cavendish Laboratory, Cambridge*), **Radio investigations of the structure of the solar corona.** (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 246–252. 4 figs.) **DWB**—Observations of the solar emission at meter wavelengths may be used to derive information of the distribution of electron density and temperature in the undisturbed solar corona. It is necessary to determine at each of several wavelengths not only the total intensity but also the distribution of "radio brightness" across the solar disk. These measurements have been made by observations of the variation of intensity during an eclipse, and more extensively by using interferometric methods to provide a sufficiently high resolving power. Using the results of such observations preliminary models of the solar corona have been derived. An entirely different method of observation has been used to study the outermost layers of the solar envelope. In this method, observations are made of a radio star at different angular distances from the sun. The results show that as this angle decreases the apparent singular size of the radio star increases, due to scattering by irregularities in the electron density. It has been possible to detect this effect out to distances of $20R_0$, and important deductions about the electron density in this region can be made. *Subject Headings:* **1. Corona structure 2. Solar radio emissions.**—*Author's abstract.*

9B–157 523.746

Tandberg-Hanssen, Einar, **A study of the penumbra-umbra ratio of sunspot pairs.** *Astrophysica Norvegica*, Oslo, 5(7):207–227, Jan. **1956.** 12 figs., 5 tables, 5 refs. **DWB**—The earlier work of Jensen, Nordø and Ringnes on the penumbra-umbra ratio q of isolated, regular sunspots has been extended to double and composite spots. A number of their findings has been confirmed. Results: 1. A more or less periodic variation of q with time has been found for many spots, the periods ranging from one to four or five days. 2. No dependence of q on the distance Δ between the components of bipolar spots seems to exist for $\Delta > 3°$. The importance of this in connection with the study of the geometry of single spots is stressed. 3. A different behavior of the spots in their dying-out phase in years of maximum and minimum solar activity is found and may possibly be related to the difference in the turbulent motion of the solar atmosphere at maximum and minimum epochs. 4. A marked tendency of q to fluctuate in phase with the solar activity is found. 5. The q-ratio is, as a rule, greater for composite than regular spots. The distribution of these types of spots has been investigated. *Subject Heading:* **1. Sunspots.**—*Author's abstract.*

9B–158 523.746

Visser, S. W., **Het komende zonnevlekken-maximum.** [The coming sunspot maximum.] *Hemel en Dampkring*, The Hague, 54(7/8):140–142, July/Aug. **1956.** fig., 4 refs. **DWB, DLC**—The author analyzes the sunspot activity during 1955 and Jan.–March 1956 and concludes that a high maximum in the current 11-year sunspot cycle is to be expected in Aug. 1957 and that sunspot activity will remain high during 1957 and 1958. *Subject Headings:* **1. Sunspot cycles 2. Solar activity.**—*I.L.D.*

9B–159 523.75

Waldmeier, M. (*Swiss Federal Obs., Zurich*), **Aspect of the corona in front of the sun's disk.** (In: **Solar eclipses and the ionosphere: a symposium** . . . ed. by W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** p. 164–166. 2 figs., ref.) **DWB**—Although a qualitatively correct picture of the corona over a given point of the solar disk, not on the limb, can be obtained by interpolation from the observed intensity over the point when it was on the limb, this method neglects the varying depth of coronal material penetrated along different lines of sight. The monochromatic corona thus determined will show pronounced limb brightening. *Subject Heading:* **1. Sun's corona.** —*Author's abstract.*

9B–160 523.7

Waldmeier, M., **Das Magnetfeld der Sonne.** [The magnetic field of the sun.] *Umschau*, Frankfurt, a.M., 56(14):429–431, July 15, **1956.** 7 figs. **DLC**—The corona shows the existence of a magnetic field in the sun. Its investigation by G. H. Hale and by H. D. and H. W. Babcock is described. Magnetograms show the local areas connected with sunspot groups and faculae. The general field is only 1–2 oersted and is only recognizable in the sun's polar regions. The polar rays of the corona are illustrated and the lines of force and magnetic field strength are shown diagrammatically. *Subject Heading:* **1. Sun's magnetic field.**—*C.E.P.B.*

9B–161 523.72:546.291

Zirin, Harold, **The helium equilibrium in prominences and the chromosphere.** *Astrophysical Journal*, 123(3):536–543, May **1956.** 2 tables, 10 refs., 22 eqs. **DWB, DLC.** Also issued as: Harvard Univ. Observatory. Solar Dept. Contracts AF 19(604)-146 and AF 19(604)-969, Scientific Report No. 36.—The equilibrium of helium in a gas suspended above the photosphere is analyzed by computing in detail the various atomic processes involved and writing down the equilibrium equations. These equations are solved for the occupation numbers of He III, He II, and the various important He I levels, in order to predict the relative intensity of helium lines. The triplet levels are in equilibrium (referred to the 2^3S state) with the photospheric radiation with the proper dilution factor. This gives good agreement with the 5876/10830 ratio measured by Severny. Particular attention is paid to the ratio of the lines 6678/5876. This is found to vary with temperature only, and the observed ratio should be a good measure of the temperature of helium. *Subject Headings:* **1. Solar physics 2. Helium in chromosphere.**—*Author's abstract.*

1957

9B–162 523.7

Abetti, Giorgio, **The sun.** (Trans. by J. B. Sidgwick), London, Faber and Faber, **1957.** 336 p. 112 plates, 97 figs. Price: 63 sh. Review in *Science Progress*, London, 45(180):709–710, Oct. **1957. DLC**—The first Italian edition of this work appeared in 1934. This is a translation of the second Italian edition (1951) but brought up-to-date to about 1954. It provides the most complete account available of general descriptive solar physics. Of great value to the meteorologist, biologist, and any other scientist who needs to consider the radiations from the sun. It is the standard work in its field. *Subject Heading:* **1. Solar physics.**—*From Physics Reviews.*

9B–163 523.75

Becker, U., **Beobachtung chromosphärischer Auswürfe im weissen Licht.** [Observation of chromospheric eruption in white light.] *Naturwissenschaften*, 44(21):554–555, Nov. 1, **1957.** fig., 3 refs. **DWB**—Filaments, surges and solar eruptions can generally only be seen in monochromatic light but very intense eruptions have been seen for a few minutes in white light on 12 occasions at Fraunhofer Institute in Anacapri. Example shown Aug. 30, 1957. They indicate heights of eruption of 50,000 km. *Subject Heading:* **1. Solar eruptions.**—*C.E.P.B.*

9B–164 551.590.21:016

†Brooks, C. E. P., **Annotated bibliography on solar relations with weather.** *Meteorological Abstracts and Bibliography*, 8(1):95–119, Jan. **1957. DWB**—An annotated bibliography of 117 items dealing with meteorological parameters affected by solar phenomena and statistical studies of the relation of solar activity to these parameters. Literature on solar effects on ionosphere and geomagnetic activity has not been included. Imprints generally are for the period from 1924–1956. A subject outline is included. *Subject Headings:* **1. Solar weather relationships 2. Bibliography on solar-weather relationships.**—*G.T.*

9B–165 523.74

Das, A. K.; Subrahmanyam, R. V. and Chaubal, A. S., **The solar flare of Feb. 23, 1956.** *Indian Journal of Meteorology and Geophysics*, Delhi, 8(1):7–14, Jan. **1957.** 9 figs., 2 tables, 7 refs. **DWB, DLC**—Details of solar flare observations, ionospheric and geomagnetic records, etc. obtained at Kodaikanal Astrophysical Observatory on Feb. 23, 1956 are discussed and illustrated. The flare, though great, was not the biggest ever observed, but it did give rise to the greatest cosmic ray burst ever recorded, and though the severe geomagnetic disturbance which followed (Feb. 25) was not the severest on record, the ionospheric and radio disturbance was phenomenal. Time of travel from sun varied from 18–23 min. for cosmic ray particles to 48 hrs for the corpuscular radiation which produced the geomagnetic and radio disturbances. *Subject Headings:* **1. Solar flare, Feb. 23, 1956 2. Cosmic ray bursts 3. Geomagnetic storm, Feb. 23, 1956. 4. Kodaikanal, India.**—*M.R.*

9B–166 551.521.64:537.531:551.507.362

Warwick, J. W. and Zirin, H., [**Comments on**] **Chubb, T. A.; Friedman, H.; Kreplin, R. W. and Kupperian, J. E., Jun.: Rocket observation of X-ray emission in a solar flare.** *Nature*, London, 180(4584):500–501, Sept. 7, **1957.** 8 refs. **Reply by Chubb et al.** *Ibid.*, p. 501–502. **DWB**—On July 20, 1956, during a solar flare which gave normal Lyman alpha and enhanced X-ray emissions from the sun, cosmic noise fell to 93% of average at 1912 U.T., becoming normal again by 1920. The origin of 3-A. X-rays is discussed; the possibility is considered that they are produced locally in the earth's atmosphere. CHUBB et al. point out that X-rays were detected only when the photon counter in the rocket could "see" the sun The X-ray source increased electron density in the *D*-layer by 40%. (For original article, *see* 8.7–209, July 1957, *MAB.*) *Subject Headings:* **1. Cosmic ray variations 2. X-radiation 3. Rocket research.**—*C.E.P.B.*

9B–167 523.75

Maxwell, A. and Swarup, G., **New spectral characteristics in solar radio emission.** *Nature*, London, 181(4601):36–38, Jan. 4, **1958.** fig., 6 refs. **DWB**—Sweep-frequency experiments begun at the Harvard Radio Astronomy Station in Sept. 1956 revealed an inverted U-shaped burst on 100–580 Mc/s band covered by the radio telescope, on 28 occasions during the first 12 months. Explanation in terms of speed of corpuscular emissions with respect to plasma and magnetic field is given. It was predicted that the U-bursts would originate from activity in the region of bipolar sunspots. This was confirmed by the fact that 80% of the bursts were associated with flares and 80% of these flares occurred over bipolar areas. *Subject Heading:* **1. Solar radio emissions.**—*M.R.*

SUPPLEMENTARY MATERIAL

9B–168 523.7

†Waldmeier, M., **Das Sonnensystem.** [The solar system.] (In: Landolt-Börnstein, **Zahlenwerte und Funktionen.** 6th ed., edited by Arnold Eucken. Berlin, Springer, **1950–52.** V. 3, **Astronomie und Geophysik,** Sec. 313, p. 60–74. 2 figs., tables, refs.) Also: Kluber, H. v., **Magnetische Felder.** [Magnetic field.] *Ibid.*, Paragraph 31319, p. 74–76. 3 tables, 30 refs. **DLC**—For the basic data and constants on the size, rotation period, fine structure, sunspots, faculae chromosphere, eruptions and protuberances, corona, 11 year cycle, and index of solar activity (catalog for each month from the year 1749 to 1950, incl.), zones of activity, magnetic fields, etc. Each section named above has a list of pertinent references appended. *Subject Headings:* **1. Solar features 2. Solar astrophysical data 3. Astrophysical constants.**—*M.R.*

PART III. REVIEWS, TRANSLATIONS, REPRINTS, RECENT MONOGRAPHS, AND ANALYTICS FROM SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological Abstracts and Bibliography.**

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIAL

Alisov, B. P.; Drosdov, O. A. and Rubinshteĭn, E. S.: **Lehrbuch der Klimatologie** [Textbook of climatology: trans. of their **Kurs klimatologii, Pt. 1–2**]. Berlin, Deutscher Verlag der Wissenschaften, 1956. 536 p. 150 figs., plates, numerous tables, 137 refs. Review by H. E. Landsberg in *American Meteorological Society, Bulletin*, 38(8):498–500, Oct. 1957. (*For abstract on the original, see* 4.8–1, Aug. 1953, *MAB*)

Azzi, Girolano: **Agricultural ecology.** London, Constable, 1956. 424 p. 47 figs. (incl. photos), numerous tables, numerous eqs. Review by Leslie Curry in *Geographical Review*, N. Y., 48(1):138–140, Jan. 1958 (*See* 8.3–5, March 1957, *MAB*)

Chicago. Univ. Dept. of Meteorology: **Cloud Physics Research.** Contract AF 19(604)-618, Final Report, by H. R. Byers et al., Jan. 31, 1956. 32 p. fig., 7 tables, 51 refs. Review by Henri Dessens in *Puy de Dome. Observatoire, Bulletin*, n.s., No. 3:101–102, July/Sept. 1957. (*See* 8.6–342, June 1957, *MAB*)

Ertel, Hans: **Ein Problem der meteorologischen Akustik: die tagesperiodische variation der Schallintensität** [Problem in meteorological acoustics: the daily variation of sound intensity]. *Akademie der Wissenschaften, Berlin. Klasse für Mathematik, Physik und Technik, Sitzungsberichte*, No. 2, 1955. 17 p. 14 refs., 30 eqs. Review by R. C. Staley in *Applied Mechanics Reviews*, N. Y., 10(8):380, Aug. 1957. (*See* 8.9–329, Sept. 1957, *MAB*)

Fishman, Myer M.: **Light scattering by colloidal systems: an annotated bibliography.** River Edge, New Jersey, Technical Service Laboratories, Jan. 1957. 84 p. Price, $2.25. Review by B. A. Brice in *Optical Society of America, Journal*, 47(10):977, Oct. 1957.

Franklin Institute, Philadelphia: **Earth satellites as research vehicles: Proceedings of the Symposium held April 18, 1956 at the Institute.** Its *Monograph*, No. 2, June 1956. figs. and bibliogs. throughout. Review in *Physics Today*, N. Y., 10(5):43, May 1957.

Mücher, Hans: **Psychische und physiologische Wirkungen des Wetters** [Psychological and physiological effects of weather]. Aulendorf, Editio Cantor, 1957. 124 p. 25 figs., bibliog. (*Arzneimittel-Forschung*, No. 7.) Review by H. E. Landsberg in *American Meteorological Society, Bulletin*, 38(7):436–437, Sept. 1957. Review by F. Sauberer in *Wetter und Leben*, Vienna, 9(3/5):84, 1957.

Neis, Bernhard: **Fortschritte in der Meteorologischen Forschung seit 1900** [Progress in meteorological research since 1900]. Frankfurt a.M., Akademische Verlagsgesellschaft, 1956. 238 p. figs., ports, tables, eqs., bibliog. at end of each ch. Review by W. Mörikofer in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 10(1):114–115, 1957. Review in *La Météorologie*, Ser. 4, No. 44:412, Oct./Dec. 1956. Review by H. Sebastian in *World Meteorological Organization, WMO Bulletin*, 6(4):164–165, Oct. 1957. (*See* 8.8–17, Aug. 1957, *MAB*)

Norske-Engelsk-Amerikansk Teleforskningsgruppe, Oslo: **Second report of investigations into certain solifluction and patterned ground features in Norway.** Oslo, 1957. Size $11\frac{1}{2}'' \times 8\frac{1}{2}''$. 41 p. Map, diagrs., illus. Price, 5 sh. Review by W. V. Lewis in *Geographical Journal*, London, 73(3):395, Sept. 1957.

Petterssen, Sverre: **Weather analysis and forecasting, Vol. 2, Weather and weather systems.** 2d ed. N. Y., McGraw-Hill, 1956. 266 p. Numerous figs., tables, eqs. Bibliog. at end of each ch. 7 plates (fold.) in pocket. Review by R. S. Scorer in *Weather*, London, 12(8):263, Aug. 1957. Review by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 10(1):110–112, 1957. (*See* 8.4–7, April 1957, *MAB*)

Precht, H.; Christophersen, J. and Hensel, H.: **Temperatur und Leben** [Temperature and life]. Berlin, Springer, 1955. 514 p. 182 illus. Price, DM 78. Review by Ludwig von Vertalanffy in *Science*, Wash., D. C., 123(3201):805, May 4, 1956. (*See* 7.11–11, Nov. 1956, *MAB*)

Rawer, Karl: **Die Ionosphäre** [The ionosphere]. Groningen, P. Noordhoff, 1953. 179 p. 67 figs., 143 refs., 68 eqs. Review by W. Dieminger in *Zeitschrift für Flugwissenschaften*, Brunswick, 2(11):307, Nov. 1954. (*See* 6D–297, April 1955, *MAB*)

Riazanov, Vladimir A.: **Sanitarnaia okhrana atmosfernogo vozdukha** [Sanitary safeguard of atmospheric air]. Moscow, Gosud. Izdatvo, 1954. 235 p. 20 figs., 52 tables, bibliog. p. 227–231. Review by George Tipikin in *Air Pollution Control Association, Journal*, 7(3):227–233, Nov. 1957. (*See* 8.3–26, March 1957, *MAB*)

van de Hulst, H. C.: **Light scattering by small particles.** N. Y., John Wiley, 1957. 470 p. 103 figs. Price, $12.00. Review by Herman Feshbach in *Review of Scientific Instruments*, 28(11):972, Nov. 1957. Review by W. L. Godson in *World Meteorological Organization, WMO Bulletin*, 6(4):164, Oct. 1957.

B. TRANSLATIONS, REPRINTS AND RECENT MONOGRAPHS

TRANSLATIONS

Al'pert, Ia. L.; Ginzburg, V. L. and Feĭnberg, E. L.: **Radiowave propagation.** (Trans. into English of various parts of the original Russian **Rasprostranenie radiovoln,** which was issued Moscow, Gos. Izdat. Tekhniko-Teoreticheskoĭ Literatury, 1953. 883 p. 128 figs., 124 tables, 373 refs.) Trans. available for loan only from Special Libraries Association Translation Center, John Crerar Library, Chicago, as its R-1929 through R-1937. For specific information, see its *Translation Monthly*, 3(10):349–350, Oct. 1957. (*For abstract on the original Russian, see* 6D–149, April 1955, *MAB*)

Besprozvannaia, A. S. and Lovtsova, V. A.: **State of the ionosphere in the high latitudes according to observational data for Tiksi Bay.** (Trans. from original Russian, issued Leningrad, Morskoĭ Transport Press, 1956.) Trans. by E. R. Hope, issued as *Canada. Defence Research Board, Translation* T-250-R, July 1957. 46 p. 23 figs. (with English legends), 22 refs. Available for reference, DWB.

Chebotarev, A. I.: **Gidrologiia sushi** [Land hydrology]. Ed. by V. I. Uryvaev. Leningrad, Gidrometizdat, 1955. 396 p. 137 figs., photos, 61 tables, 16 refs., 105 eqs. A Review by V. M. Pavlov in *Meteorologiia i Gidrologiia*, Leningrad, No. 6:67, June 1956, is trans. into English and available for reference DWB (627 P3384bo).

Conference on the Physics of Cosmic Rays. (Trans. of *Akademiia Nauk SSSR, Izvestiia* (?), Vol. 19, no. 5, 1955, which contained the **Proceedings of the 3rd All-Union Conference on the Physics of Cosmic Rays, Moscow, Dec. 15–23, 1954,** under the chairmanship of S. N. Vernov.) Trans. into English issued White Plains, N. Y., Columbia Technical Translation, 1956. 109 p. Paperbound. Price of trans., $20.00. Review of trans. by R. D. Sard and H. Primakoff in *Physics Today*, 11(1):29–30, Jan. 1958.

Haude, W.: **Temperature and exchange of the ground layer of air over a desert.** (Trans. into English of original German **Temperatur und Austausch der bodennahen Luft über einer Wüste,** in *Beiträge zur Physik der Freien Atmosphäre*, 21(2):129–142, 1934.) Trans. available Commonwealth Scientific and Industrial Research Organization, Information Service, 314 Albert St., E. Melbourne, C. 2, Victoria, Australia, as its CSIRO-3353. (*See* 4B–84, Feb. 1953, *MAB*)

Kessenikh, V. N.: **Geophysics and astroheliophysics of the ionosphere.** (Trans. into English of the original Russian **Geofizika i astrogeliofizika ionosfery.** Original source not given.) Trans., issued 1957, available as ASTIA AD-140-553. 58 p. incl. illus. and tables

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REPRINTS

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PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

★**Acta Geophysica Polonica,** [Warsaw].
Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. and **Ser. Geofiz.,** [Moscow].
American Geophysical Union, Transactions, [Washington].
★**American Meteorological Society, Bulletin,** [Boston].
★**Angewandte Meteorologie,** [Potsdam].
Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
★**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B,** [Vienna].
Australian Journal of Physics, [Melbourne].
★**Australian Meteorological Magazine,** [Melbourne].
★**Ciel et Terre,** Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels].
★**Geofisica e Meteorologia,** Società Italiana di Geofisica, [Genoa].
Geofisica Pura e Applicata, Istituto Geofisico Italiano, [Milan].
★**Geophysical Magazine,** Japan Meteorological Agency, [Tokyo].
Hemel en Dampkring, [The Hague].
★**Időjárás,** Magyar Meteorólogiai Társaság and Országos Meteorológiai Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
★**Journal of Atmospheric and Terrestrial Physics,** [London].
Journal of Geophysical Research, [Washington].
★**Journal of Meteorological Research,** [Tokyo].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorologické Zprávy** [Prague].
★**Meteorological Society of Japan, Journal,** [Tokyo].
★**La Météorologie,** Société Météorologique de France, [Paris].
★**Meteorologiia i Gidrologiia,** [Leningrad].
★**Meteorologische Rundschau,** [Berlin].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
Polarforschung, Archiv für Polarforschung, [Kiel].
★**Przegląd Meteorologiczny i Hydrologiczny,** [Warsaw].
Revista de Geofísica, Instituto Nacional de Geofisica, [Madrid].
★**Revista Meteorologica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Servizio Meteorologico, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**South Africa, Weather Bureau, Notos,** [Pretoria].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** American Meteorological Society, [Boston].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**WMO Bulletin,** World Meteorological Organization, [Geneva].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

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